JE JAY

Volume 67 Number 2 June 2009

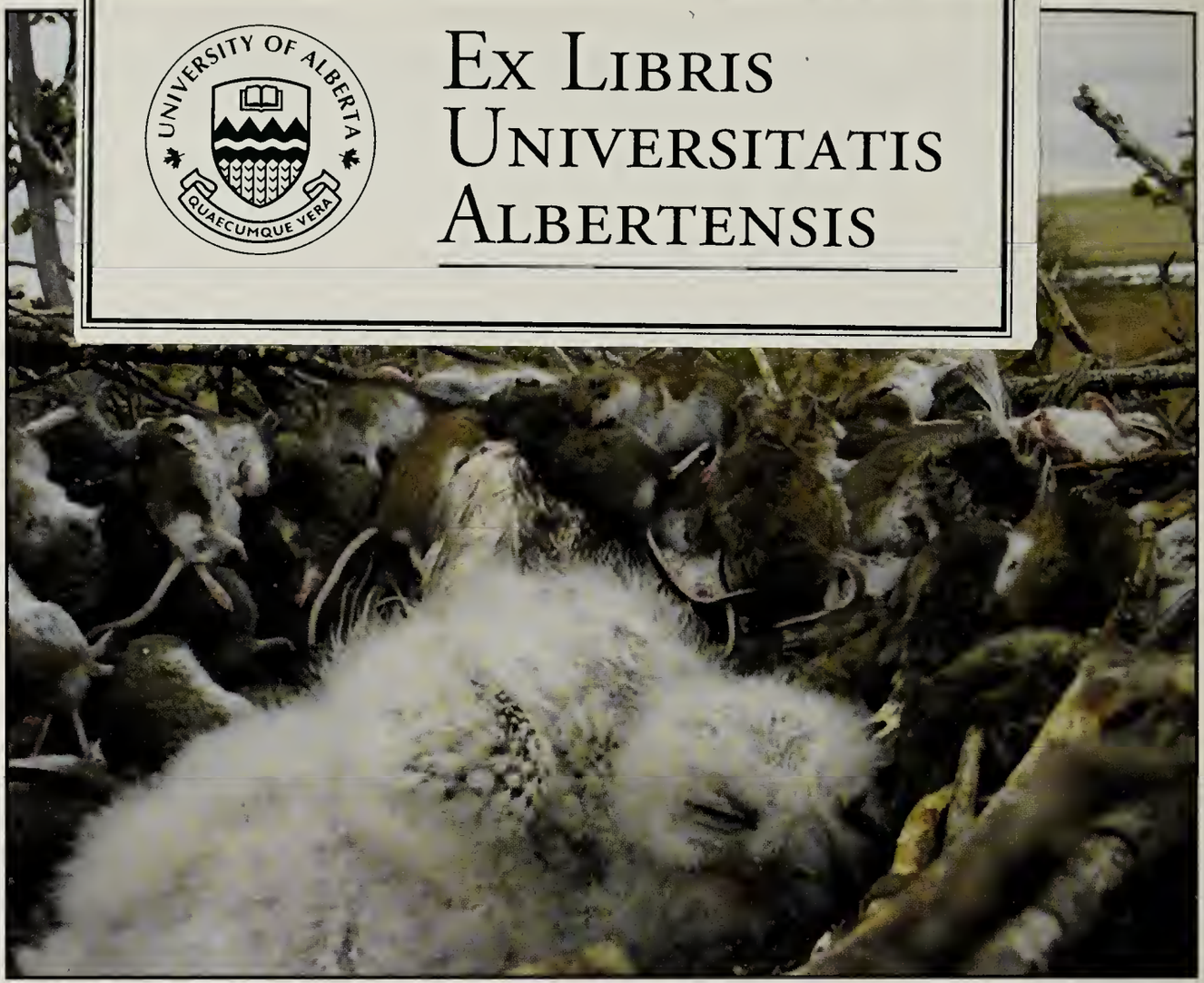
PLANTS OF SASKATCHEWAN
University of Saskatchewan, Regina

No. 3522 Date July 12, 1963

Lilium philadelphicum L.
var. andinum (Nutt.) Ker.

associated with Salix brachycarpa,
grassy meadow in Great Sand Hills,
28 miles west of Cabri

G. F. Ledingham, M. D. Fahselt et al.



Blue Jay

Vol. 67 No. 2 June 2009 65-128

Front cover: *Western Red Lily (*Lilium philadelphicum *var.* andinum*) collected in the Great Sand Hills in 1963, from the collection of the G.F. Ledingham Herbarium, University of Regina. This specimen showcases the importance and simple beauty of herbarium specimens. For more on local herbaria, see articles by Cota-Sánchez & Harms (page 98) and Barker (page 104).*

Don Hall

Back cover: *American Badger observed at the Cypress Hills Inter-provincial Park, Saskatchewan. For a description of unusual badger behaviour, see article by Holroyd & Trefry, page 80.*

Vicky Kjoss and Chris Somers

Inside front cover:

top: Figure 2. Young GHOW and numerous deer mice in a nest south of Kyle, SK. See article by Gerard et al. *on page 71.* *Dan Zazelenchuk*

bottom: American Dipper observed in Saskatoon, SK. For more on unusual bird sightings this spring, see note by Saunders on page 114.

Nick Saunders

Inside back cover:

top: Figure 2. A) Brain Scale from Arizona. Specimen from B. de Vries' private herbarium # 2606-2003/05/20. B) Blushing Scale from Saskatchewan. Specimen from B. de Vries' private herbarium # 1317-2004/07/07. C) Brain Scale photographed at the discovery site in Eastend by Bernard de Vries. See article by DeVries on page 86.

bottom: June 2009 Mystery Photo *Vicky Kjoss and Chris Somers*

Some keep the Sabbath going to Church,
I keep it staying at Home -
With a bobolink for a Chorister,
And an Orchard, for a Dome.
- Emily Dickinson

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EDITORS' MESSAGE

What kind of publication is *Blue Jay*? Is it a scientific journal or a magazine? A recent conversation with an academic colleague about whether to publish some bird population data in *Blue Jay*, or instead to try for a "more credible peer-reviewed science journal," recently forced us to reflect on this issue. As Editors, it is our duty to ponder what the specific role of the *Blue Jay* is now, and what it might strive to be in the future. A "magazine" can be defined as:

A regular publication that contains articles written and illustrated in a less technical manner, generally intended for the general public rather than researchers.[1]

Blue Jay publishes poetry, photography, art, and essays. These pieces clearly give *Blue Jay* features of a magazine. In contrast, a "peer-reviewed journal" can be defined as:

A regular publication whose articles contain data, analyses, and interpretations that have been assessed by other scholars and judged by them to be of a sufficiently high standard.[1]

Blue Jay also publishes scientific articles that contain natural history facts and data (for a thorough discussion of what natural history is, see Editors' Message in *Blue Jay* 66[2]:67-69, June 2008). These natural history articles are reviewed by the Editors, who are professional scientists, and by Associate Editors and Reviewers, who are experts in the subject matter under consideration. Thus, *Blue Jay* clearly delves into the world of peer-reviewed publications and draws on the expertise of other scholars to maintain a high standard for its science. Academics can rest assured that their papers will receive appropriate scrutiny. However, there are several important differences between *Blue Jay* and other peer-reviewed journals.

Academic journals contain articles exclusively written by professional scientists for other professional scientists. They often have high rejection rates (sometimes in excess of 90%), thereby excluding all but the most thorough or provocative studies. Most academic journals also discourage publishing observational studies, including accumulation of basic natural history data, monitoring population trends, and opportunistic observations. This opens a unique niche for *Blue Jay*. Our publication takes advantage of the peer-review system to ensure high quality for our reported science, but we accept articles from people of all walks of life. We welcome submissions from professional scientists and hobbyists alike, and we attempt to make the published articles accessible, educational, and interesting to both of these audiences and to everyone between. In addition, *Blue Jay* publishes extremely valuable observational information that is often discounted by strictly academic journals.

To conclude, we were forced to ask ourselves whether *Blue Jay* should move towards adopting the editorial and review policies of an academic peer-reviewed journal. The answer was a resounding "No!". *Blue Jay* is unique; it offers aspects of both a formal science journal and a magazine, and it does not exclude contributors based on their education or training level. To the contrary, *Blue Jay* takes advantage of the knowledge and observations that are available from a much broader audience, and combines the best of two very different worlds. As Editors, we will work hard to preserve this special role for *Blue Jay*, and we thank all those who have contributed.

1. Swansea University, Library and Information Services glossary, Wales, UK. <http://www.swan.ac.uk/lis/HelpAndGuides/LibraryJargon/GlossaryM-Z/>

SATELLITE TRACKING AND RECOVERY OF A MARBLED GODWIT AT THE LAST MOUNTAIN LAKE NATIONAL WILDLIFE AREA, MAY-SEPTEMBER 2006

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Last Mountain Lake National Wildlife Area (LML NWA) is recognized for its importance to migrating shorebirds through its designation as a wetland of international importance (RAMSAR) and as a member of the Western Hemisphere Shorebird Reserve Network. In 2006, one migrating shorebird demonstrated the importance of the continental wetland network.

In April, 2006 an adult female Marbled Godwit (hereafter, godwit) was trapped and outfitted with coloured leg bands and a solar-powered satellite transmitter (12 g) at the Bear River Migratory Bird Refuge (BRMBR) in Utah (Fig. 1) by the U.S. Geological Survey (USGS) and the U.S. Fish and Wildlife Service (USFWS). Continuous recording of movements by the bird was conducted for a 6-hour period out of every 30 hours.

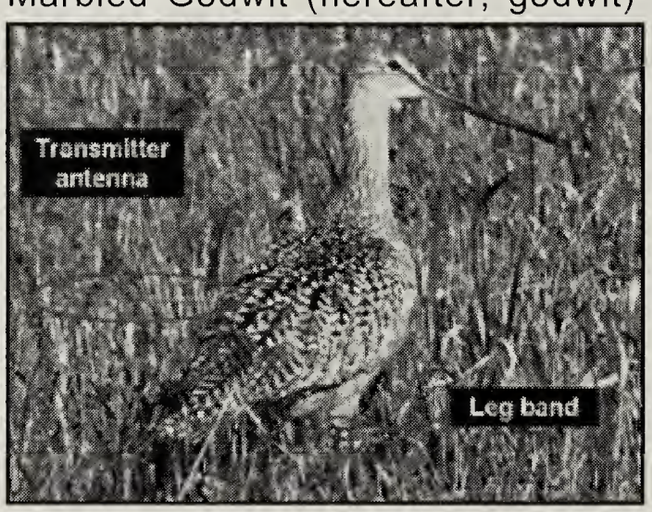

Figure 1. Female marbled godwit outfitted with transmitter and plastic leg bands in Utah. An aluminum numbered band on the upper left leg cannot be seen in this photo, taken on 4 May 2006. *Philip S. Taylor*

The godwit remained at the BRMBR until 30 April 2006 (Fig. 2). At 1030h, the satellite signal indicated that the bird was probably in flight about 70 km north of the BRMBR. The next signal came from Old Wives Lake Migratory Bird Sanctuary in southern Saskatchewan on 1 May, indicating that the bird had moved in a direct flight of approximately 1100 km. Exact arrival time is unknown because of the satellite blackout period. The following day, the signal came from the northeast corner of the LML NWA, approximately 150 km farther northeast.

The godwit was found and photographed in a hayfield in the LML NWA on 4 May with a second godwit. The presence of a second adult, which

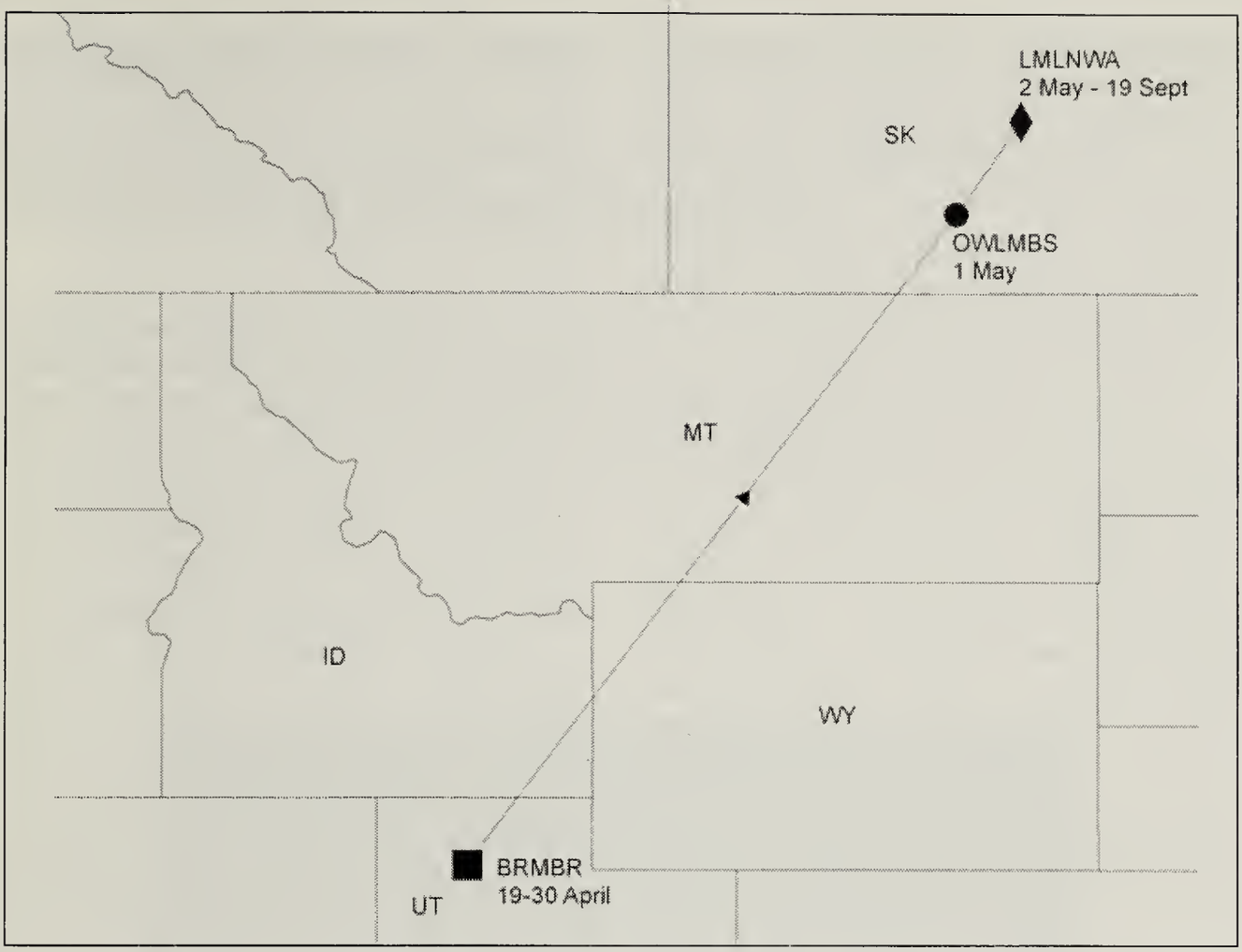

Figure 2. Migration route of a Marbled Godwit between Bear River Migratory Bird Refuge (BRMBR; Utah), Old Wives Lake Migratory Bird Sanctuary (OWLMBS; Saskatchewan) and Last Mountain Lake National Wildlife Area (LML NWA; Saskatchewan), 30 April to 2 May 2006. *Lois Vanthuyne*

was observed chasing other godwits in the immediate area during the same morning, suggested that a territory was being established. The godwit was nicknamed "Sassy" because she had flown to Saskatchewan.

"Sassy" was monitored by satellite throughout the summer. Concern was raised in late August, as transmitter signals continued to come from the same area where "Sassy" spent the summer. Many adult female godwits leave their breeding areas in Saskatchewan to join post-breeding flocks by early July, although a few will remain until chicks fledge. The USFWS contacted us and requested a search be made to locate the radio transmitter and to determine the fate of the bird if possible. The satellite signal indicated some movement; however, signal drift likely accounted for this (the transmitter's accuracy was ~125 m).

We conducted a series of grid-patterned walking searches in the area from which the signal came but failed to find any clues about either the godwit or the transmitter. A metal detector was ineffective because tall grass prevented it from getting close enough to the ground. Eventually, a weed trimmer was used to remove visual obstruction by vegetation stems. The colour of the transmitter was a dull khaki green, making detection more difficult.

Much of the search area was covered with tall, thick stands of Smooth Brome Grass *(Bromus inermus)*, Canada thistle *(Cirsium*

arvense), and Western Snowberry *(Symphoricarpos occidentalis)*. This vegetation structure seemed unsuitable as a feeding, nesting, or roosting area when more typical godwit habitat of short patchy vegetation at a newly-dried shallow slough was nearby.

After more than 7 hours (over 2 days) of weed trimming, the remains of a godwit skeleton were found near an LML NWA boundary fence on 19 September (Fig. 3). The upper skeleton was intact, completely stripped of all flesh, but the leg bones were missing, and there was no transmitter. It took another 3 hours to find the leg bones, the coloured leg bands, and the transmitter, which were lying together about 10 m farther along the fence.

The cause or date of the death is unknown. The drift of the satellite signal suggested movement even after the bird was dead. Possible predators include Swainson's Hawks (a nest was active ~100 m from the recovery site) or coyote; however, remains of the body do not strongly suggest either predator. Avian predators usually pluck bird prey but often decapitate the body in the process of eating the flesh. A coyote would have dismembered the body. The skull was still attached to the spine when found. A few primary flight feathers were also recovered from beneath the skeleton.

For decades, biologists have relied heavily on the recovery of banded birds to determine migration patterns. The recovery rate for most species is very low. Even when a band is found, many questions remain unanswered, including speed of migration, exact dates of movements, and locations of important stopover points where "refuelling" takes place. This experiment with satellite technology answered some of these questions about Marbled Godwit migration to Saskatchewan. "Sassy" linked three of the 64 sites designated as crucial for shorebirds in the Western Hemisphere.

Acknowledgements

We thank the *Blue Jay* editors and an anonymous reviewer for their suggestions to improve the manuscript. Adrian Farmer (USGS) and Bridget Olson (USFWS) trapped and outfitted the godwit. Lois Vanthuyne (Canadian Wildlife Service) prepared the map.

Figure 3. Coloured leg bands, leg bones, and satellite transmitter at the recovery site after a covering of dead grass had been removed from above the items to help their visibility for this photograph 19 September 2006.

Ross Dickson

A SAMPLE OF PREY REMAINS FOUND IN GREAT-HORNED OWL NESTS IN SASKATCHEWAN IN 2008

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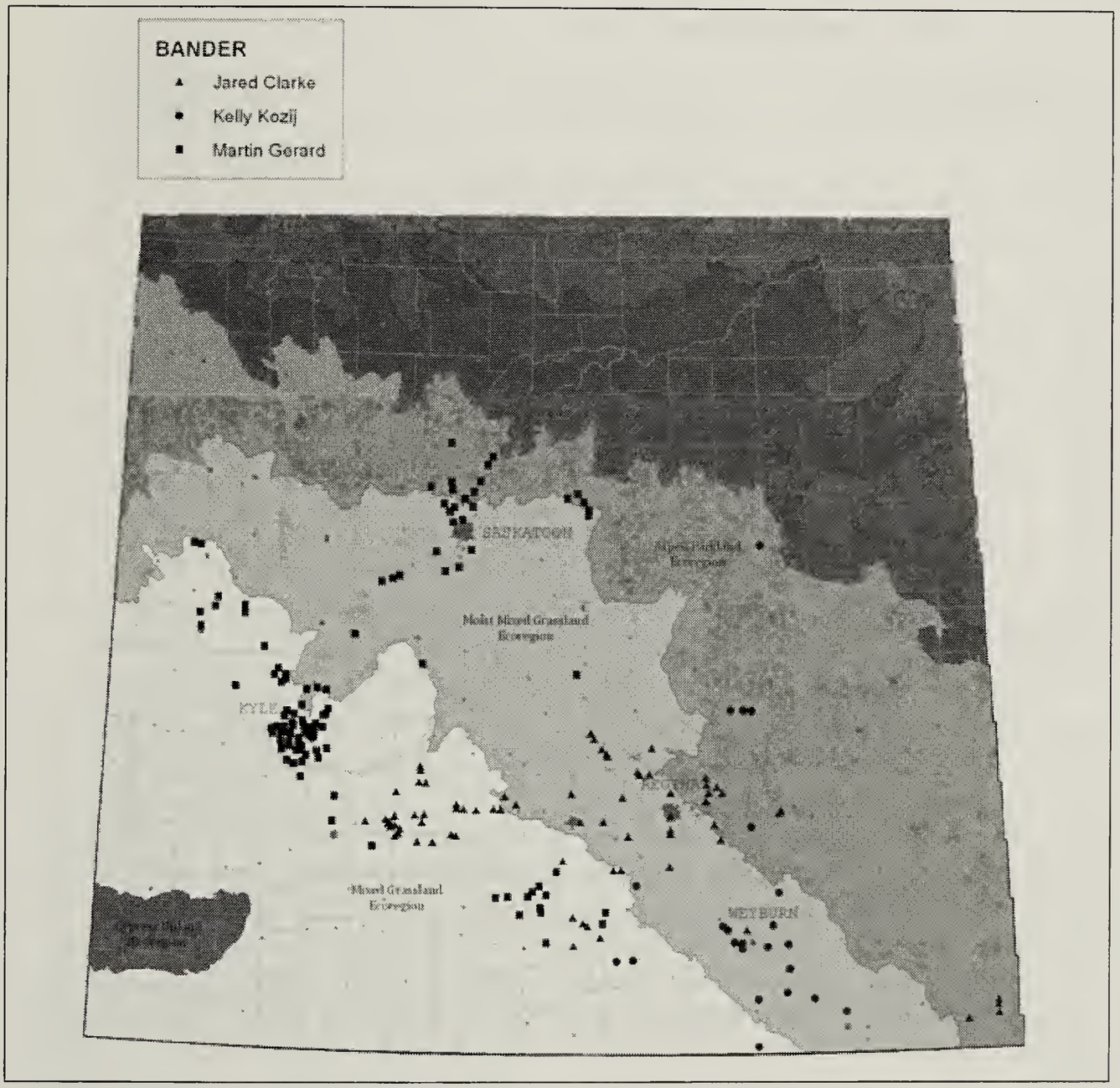

Figure 1. Locations of GHOW nesting sites visited in Southern Saskatchewan in 2008. *Ray Poulin*

We visited 210 Saskatchewan Great-horned Owl (GHOW) nesting sites between 27 April and 3 July 2008 (Fig. 1). Our objectives were to: (a) band the young, (b) identify trends in the types of nesting trees or other structures selected by owls, and (c) to document aspects of GHOW diet by examining prey remains.

GHOW nesting habitats varied widely, as would be expected for a

species that opportunistically uses nests of other birds. In the Aspen Parkland surrounding Saskatoon, Trembling Aspen (*Populus tremuloides*) predominated as nest trees, while in the farmyards in the Kyle region, Manchurian Elm (*Ulmus laciniata*) and Ash were more commonly used. Also represented, in order of frequency, were Manitoba Maple (*Acer negundo*), hybrid poplar (*Populus* sp.), White Spruce (*Picea glauca*), Eastern Cottonwood (*Populus deltoides*), American Elm (*Ulmus americana*), willow (*Salix* sp.), and Balsam Poplar (*Populus balsamifera*) (Table 1). Eight nests were in man-made structures: five barns, a wooden box in a spruce, a basket in a spruce, and one on a tire mounted on a 3-m pole.

Table 1. Great-horned Owl nest sites.

# nests banded at	Tree species	% of total
25	Ash	11.9
66	Trembling Aspen	31.4
5	Balsam Poplar	2.4
10	Eastern Cottonwood	4.8
9	American Elm	4.3
31	Manchurian Elm	14.8
19	Manitoba Maple	9
18	Hybrid poplar	8.6
15	Spruce	7.1
6	Willow	2.9
5	Barn	2.4
1	Tire on post	0.5
Total 210		

Food items recovered from GHOW nests also varied widely. Of the 210 nests, 82 had no food, and at 21 others, food data were unavailable, predominantly owing to poor climbing conditions. American Coot (14.7%) and Gray Partridge (5.2%) were the most abundant bird species found (Table 2). Two nests contained Burrowing Owls, three had Long-eared Owls, three had Short-eared Owls, one had an American Kestrel, and one contained Northern Harrier feathers. Remains of adult and young GHOW, Cooper's Hawks, Red-tailed Hawks, Swainson's Hawks, and Merlins have also all been found in Saskatchewan GHOW nests in previous years (unpublished data). Northern Pocket Gophers and Deer Mice were the most common mammalian prey species (10.8% and 8.6% of total individual prey items, respectively; see Fig. 2, inside front cover). Other numerous prey items included waterfowl, lagomorphs (rabbits and hares), and various rodent species. In total, 35 species of birds (127 items) and 13 species of mammals (102 items) were identified. One reptile, a garter snake (likely *Thamnophis radix*), was also found. Regurgitated pellets that contained Giant Water Bug (*Lethocerus americanus*) shells were found at two nests.

We used time-lapse photography to identify prey items in one GHOW nest near Yellow Grass from 1840h on 6 May to 1920h on 12 May. We took 648 photographs at 15-minute intervals.

Table 2. Prey species of Great-horned Owls.

Species	# of individuals found in nest	% occurrence based on # individual prey (232)	# of nests containing item	% occurrence based on # nests (210)
Birds				
American Wigeon	5	2.2	5	2.4
Mallard	5	2.2	5	2.4
Blue-winged Teal	8	3.4	6	2.9
Northern Shoveller	6	2.6	5	2.4
Green-winged Teal	2	0.9	2	1
Lesser Scaup	2	0.9	2	1
Canvasback	1	0.4	1	0.5
Duck species	6	2.6	6	2.9
Sharp-tailed Grouse	1	0.4	1	0.5
Gray Partridge	12	5.2	10	4.8
Pied-billed Grebe	1	0.4	1	0.5
Horned Grebe	1	0.4	1	0.5
Eared Grebe	3	1.3	2	1
Grebe species	1	0.4	1	0.5
American Bittern	1	0.4	1	0.5
Northern Harrier	1	0.4	1	0.5
American Kestrel	1	0.4	1	0.5
Virginia Rail	1	0.4	1	0.5
Sora	1	0.4	1	0.5
American Coot	34	14.7	29	13.8

Table 2. Continued

Long-billed Curlew	1	0.4	1	0.5
Marbled Godwit	1	0.4	1	0.5
Shorebird species	1	0.4	1	0.5
Franklin's Gull	3	1.3	3	1.4
Gull Species	1	0.4	1	0.5
Rock Pigeon	6	2.6	6	2.9
Burrowing Owl	2	0.9	2	1
Great-horned Owl	1	0.4	1	0.5
Long-eared Owl	3	1.3	3	1.4
Short-eared Owl	3	1.3	3	1.4
Yellow-shafted Flicker	3	1.3	3	1.4
Horned Lark	1	0.4	1	0.5
Black-billed Magpie	1	0.4	1	0.5
American Crow	1	0.4	1	0.5
Yellow-rumped Warbler	1	0.4	1	0.5
Snow Bunting	1	0.4	1	0.5
Red-winged Blackbird	1	0.4	1	0.5
Yellow-headed Blackbird	1	0.4	1	0.5
Blackbird Species	1	0.4	1	0.5
Western Meadowlark	1	0.4	1	0.5
Total	127	54.7		
Mammals				
Long-tailed Weasel	1	0.4	1	0.5

Table 2. Continued

Least Weasel	3	1.3	3	1.4
Muskrat	2	0.9	2	1
Norway Rat	8	3.4	6	2.9
Vole species	5	2.2	3	1.4
Deer Mouse	20	8.6	13	6.2
Northern Grasshopper Mouse	2	0.9	2	1
Richardson's Ground Squirrel	9	3.9	6	1.4
Thirteen-lined Ground Squirrel	1	0.4	1	0.5
Northern Pocket Gopher	25	10.8	14	6.6
White-tailed Jackrabbit	9	3.9	7	3.3
Snowshoe Hare	1	0.4	1	0.5
Eastern Cottontail	8	3.4	7	3.3
Rabbit species	8	3.4	6	2.9
Total	**102**	**44**		
Reptiles				
Garter Snake	1	0.4	1	0.5
Insects				
Giant Water Beetle	2	0.9	2	2
Total	**232**			

Table 3. Incidence of Norway Rats, weasels, and Burrowing Owls in Great-horned Owl nests.				
Year	**Norway Rats**	**Weasels**	**Burrowing Owls**	**Nests Visited**
2000	2 (2.3%)	1 (1.1%)	0	88
2001	0	0	0	43
2002	0	0	0	76
2003	1 (1.0%)	0	0	101
2004	0	0	0	113
2005	3 (2.4%)	1 (0.8%)	0	124
2006	3 (4.5%)	0	0	66
2007	1 (1.8%)	0	0	55
Totals	**10 (1.3%)**	**2 (0.25%)**	**0**	**790**
2008	6 (2.9%)	4 (1.9%)	2 (1.0%)	210

The following prey items were photographed: Jack Rabbit, Deer Mouse, Thirteen-lined Ground Squirrel, vole, blackbird, Richardson's Ground Squirrel, male Blue-winged Teal, and Muskrat.

Norway Rats, weasels, and Burrowing Owls seemed to be represented in greater than usual numbers. Because of this, field data were reviewed for the years 2000 to 2007 (Table 3). It must be noted, however, that yearly sampling effort and surveyed regions vary. Also, in 2008, the data pooled the efforts of three banders, resulting in a much larger sample size and a much broader geographical area than in previous years.

One of the two nests at which Burrowing Owls were found as prey was an artificial platform (a tire on a post) less than 1 mi from an active Burrowing Owl colony. When we "enhance" habitats for one species, we may well be unintentionally negatively affecting others. To our knowledge, there are no previous records of Burrowing Owls having been found as prey items in Saskatchewan GHOW nests. Most notably, C.S. Houston has no record of Burrowing Owls as prey in 2922 GHOW nest visits made between 1960 and 1992 (pers. comm.).

Our data demonstrate impressive variety in the diet of the GHOW in Saskatchewan. The diversity we observed is likely an underestimate of the true diet of these birds, given that our sampling method produces a bias exaggerating the importance of larger prey. Smaller prey such as mice, voles, and Least Weasels* are likely swallowed whole by the owls soon after they arrive at the nest, and would therefore be underrepresented in our analysis. In addition, we only sampled prey items from each nest on one day, and our total effort spans only a small fraction of the year. Thus, we cannot detect seasonal changes in diet. While very interesting and informative, our diet analysis presents a limited perspective on GHOW prey.

Acknowledgements

We thank all of the nest finders and field helpers as well as Ray Poulin for his map of the 2008 nest locations.

*EDITORS' NOTE: A photograph of a Least Weasel found in a GHOW nest was published in *Blue Jay* 66(2):66.

LATE NESTING RECORD OF COMMON LOON NEAR RIDING MOUNTAIN NATIONAL PARK

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As part of the Canadian Lake Loon Survey (CLLS), Octopus Lake (50 37 N; 99 57 W) has been surveyed for Common Loons since 1999. The lake is located south of Clear Lake, Manitoba, and just south of the boundary of Riding Mountain National Park. The lake is shaped in such a way that a shallow, reed-filled "isthmus" separates the lake into two territories, allowing for two pairs of loons to nest on the lake.

On the first survey of the lake, 13 June 2008, loons were present in both territories, as in years past. While one pair had already produced two young by 17 June, the second pair did not appear to be nesting, as both adults were observed feeding in the centre of the lake on 18 June, indicating that they were not incubating eggs.

Despite not expecting to see any sign of nesting, the second pair of loons was resurveyed on 22 July. At that time, one of the loons showed unusual behaviour, and although it did not raise an alarm yodel, it "submarined" several times as it was approached, sinking so that only its head was above the water. It also made several soft calls unfamiliar to me. Due to this behaviour, the loon, which was also swimming surprisingly close to the shore, was approached by kayak. Only when I neared the loon was a nest observed, containing a downy chick and one unhatched egg. The chick was black and did not respond negatively to my approach. It was not swimming, but was simply sitting on the nest, indicating that it had hatched within the previous day.[4]

I immediately left the area to avoid disturbing the loons, but returned to the area 30 July and 6 August. On the latter date, I photographed the loon chick with its parents, as well as the

Figure 1. Nest and scavenged egg of late-nesting Common Loon, 6 August 2008. *Ken Kingdon*

nest and the remaining egg (Fig. 1). The egg was partially scavenged, and it appeared that the egg was unfertilized or non-viable, as there was no developed embryo present.

On these visits, the chick was attended by both adults. By 16 August, however, only one adult was present, and there was no time afterwards that more than one adult was seen with the chick. The last date that any adult was seen with the chick was 3 September. The lake was surveyed twice more after 3 September, with the chick being last observed on 6 October. There was no sign of the chick on 18 October, the next date that the lake was surveyed.

These observations fit with late records for nesting by the Common Loon. The latest record for the presence of eggs in Manitoba is 24 July.[3] There are also at least two records for incubation in North America of 17 July, but while it is unknown whether the Manitoba record resulted in a successful hatch, the Saskatchewan incubation as reported by Yonge was unsuccessful.[1,5] Yonge did record successful hatching into mid-July, in both replacement and original nests, but not beyond 15 July. As for my late nesting record, the eggs were likely laid during the week of 23 June, as the average incubation in Saskatchewan is 28 days, with a range of 27 to 30 days.[5] Thus, it is unlikely that the loons were incubating eggs at the time of the 18 June survey. In Yonge's study, no clutches were started after 1 July.[5]

It is possible that this chick was the result of a second nesting attempt by the pair - the first nesting attempt may have failed due to high water levels. The weather in the Riding Mountain National Park region during the spring of 2008 was unusual. The early part of spring was marked by relatively dry, cool conditions. Then, starting in mid-May, cool and wet weather brought unusual amounts of rain for the region (Stephen Cornelsen, Resource Conservation Department, Riding Mountain National Park, pers. comm.). As a result of the higher than normal precipitation, the water level in Octopus Lake appeared to be at least 15 cm higher than normal at the time of the first survey date in June. Yonge found that loons will attempt to nest a second time in 45% of cases where the first clutch is destroyed.[5]

The actual length of time that the chick was tended by an adult is unknown. As stated, the last observation of an adult with the chick was on 3 September, when the chick was 6 weeks old, but the lake was not revisited until 29 September. No adults in Saskatchewan were seen with young after 24 September.[5]

It is unknown whether the loon chick survived. It was last observed on 6 October, at 11 weeks of age. This date is approximately 1 month later than previous observations of loon chicks on Octopus Lake, as most loons depart the lake by early September. By week 11, loon chicks are generally able to become airborne, but while my observation opportunities were limited, at no time was the chick seen attempting to fly, or even flapping its wings.[4] As well, the loon chick appeared smaller in size than past fledging chicks observed on the lake.

However, also at 11 weeks of age, chicks are 90 to 100% independent for feeding, and adult loons will generally leave their young after 10 to 15 weeks of age.[4] Thus, the chick was likely able to feed itself at that time. Yonge also noted that while chick mortality can be high when first hatched, after 4 weeks of age, no mortality was evident,

suggesting that the chance of survival was high.

One concern for the chick was freeze-up, which could have prevented the chick from feeding and/or getting airborne. However, the autumn weather was considered to be above normal for the month of September, and while there was some localized frost, temperatures generally remained above normal until after Thanksgiving (Environment Canada, 2008).[2] Thus, weather should not have been a factor in chick survival.

Acknowledgements
Thank you to Bill Walley, Kurt Mazur, and an anonymous reviewer for their comments on the manuscript.

1. CAMPBELL, R. W., N. K. DAME, I. MCTAGGART-COWAN, J. M. COOPER, G. W. KAISER, and M. C. E. MCNALL. 1990. The Birds of British Columbia, Vol. I. Introduction and Loons Through Waterfowl. Royal British Columbia Museum, Victoria, BC.

2. ENVIRONMENT CANADA. 2008. Wasagaming Weather Station. Accessed Online: http://www.weatheroffice.gc.ca/city/pages/mb-31_metric_e.html

3. MANITOBA AVIAN RESEARCH COMMITTEE. 2003. The Birds of Manitoba. Manitoba Naturalists Society. Winnipeg, MB.

4. MCINTYRE, J.W., and J. F. BARR. 1997. Common Loon (*Gavia immer*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/313

5. YONGE, K. 1981. The Breeding Cycle and Annual Production of the Common Loon (*Gavia immer*) in the Boreal Forest Region. M.Sc. Thesis, University of Manitoba, Winnipeg, MB.

PUBLICATION AVAILABILITY NOTICE

TURKEY VULTURES: A PHOTOGRAPHIC GUIDE FOR AGING NESTLINGS. R.W. Nelson, D. Moore, F. Kunnas, and R. Morse. 2009. Fish and Wildlife Division, Alberta Species at Risk Report No. 124. Edmonton, AB. 44 pp. Descriptions and 80+ color photos of known-age nestlings, "... are intended to allow users ... to estimate the age of nestling Turkey Vultures, from their own photographs, to within +- two days, without handling the young birds." Part of an ongoing study at the northern edge of the breeding range. Available as a pdf download at: <http://srd.alberta.ca/fishwildlife/speciesatrisk/projectreports.aspx>

-submitted by Wayne Nelson, <wanelson@telus.net>

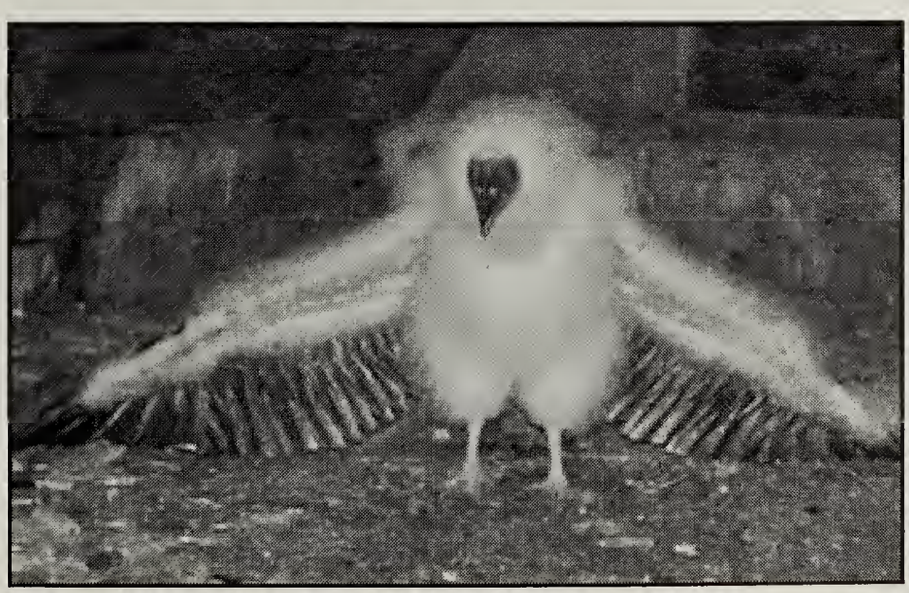

Photo from "TURKEY VULTURES: A PHOTOGRAPHIC GUIDE FOR AGING NESTLINGS" of a 42-day-old nestling Turkey Vulture, taken southeast of Elk Pt., AB, on 20 July 2008.

Wayne Nelson

BADGER KILLS AN EVASIVE BLACK-TAILED PRAIRIE DOG

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On the prairies of Canada, prey of American Badgers consists primarily of Richardson's Ground Squirrels, pocket gophers,[3] and, in a restricted area of southern Saskatchewan, Black-tailed Prairie Dogs. North American Badgers frequently hunt hibernating prey in autumn, juvenile ground squirrels in spring, and rarely, adult ground squirrels in summer.[3] Badgers often excavate their prey but occasionally catch prey above ground.[2,3] Balph described badgers waiting inside a burrow to ambush prey.[1] Schwab described a hunting badger waiting at the entrance to a burrow occupied by a Richardson's Ground Squirrel and ambushing it at the entrance.[4] In another incident, he watched the same badger lying in a bush and ambushing two Richardson's Ground Squirrels that moved to within 10 m of the badger. Here, we report an incidence of a badger chasing and killing a Black-tailed Prairie Dog as has been reported only once before.[2]

Our observation occurred in Grasslands National Park, Saskatchewan, at the Broken Hills Prairie Dog Colony (49° 10'N, 107° 36'N). On 16 May 2006, we were surveying the Black-tailed Prairie Dog colony for nesting Burrowing Owls. Our observation site was 700 m south and 40 m above the colony on a ridge.

We arrived at the observation site at 0925h and did not notice the badger on our initial scan of the colony. At 0930h, we saw a badger chasing a prairie dog. They were about 20 m apart, but the badger gained rapidly. When the badger was about 3 m from the prairie dog, it swerved and increased its lead on the badger, then dove into a burrow. The badger made a quick scan of the vicinity and immediately started digging into the burrow. Two large chucks of earth were

Figure 1. The badger broke the entrance of the burrow into large chunks before excavating the prairie dog burrow at the end of the chase.

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tossed about 0.5 m while smaller pieces of earth flew even farther (Fig. 1). Every 10 to 15 seconds, the badger emerged from the burrow, looked around, and then continued digging. After about 3 minutes, the badger emerged from the burrow with a dead prairie dog in its jaws. The badger took the prairie dog west to its den burrow.

We surmise that the badger was lying on or near its den at the start of the chase, a behaviour similar to that described by Schwab when a badger killed a Richardson's Ground Squirrel.[4] However, our observation involved an aboveground chase followed by a burrow excavation, rather than a simple ambush on the surface as reported by Eads and Biggins.[2] Based on the location of where we first saw the badger and prairie dog, the prairie dog must have approached to about 20 m from the badger's location before the badger gave chase. Using a hand-held GPS, we determined that the chase occurred over a distance of 183 m. A search showed that none of the prairie dog burrows within 50 m of the badger den were occupied. Thus, the depredated prairie dog likely wandered closer to the badger than others.

This badger demonstrated its digging ability during its rapid excavation of the prairie dog burrow. We do not know what transpired below ground, and thus can only speculate on why the prairie dog did not escape. Typically, prairie dog burrows have several passageways that allow them to escape predators. Possibly the prairie dog was not familiar with the burrow and may have ended up in a dead-end tunnel, where it was trapped by the badger. Eads and Biggins reported two successful aboveground attacks by badgers on prairie dogs in seven observed attempts.[2] They suggested the badgers initiated attacks based on the speed, angles, distance, and escape response of the prairie dog. We did not see the initiation of the encounter, but the prairie dog passed many potential escape holes over the course of a relatively long chase. We do not know if the badger waited for an opportune time to initiate the attack. Although the badger did not capture the prairie dog above ground,[2] the high-speed chase may have caused the prairie dog to make a poor choice of escape burrow. This could have been part of the badger's strategy.

Aboveground attacks by badgers on prairie dogs are rare.[2,3] Between 1998 and 2008, we have spent about 1800 person-hours over 140 days searching prairie dog colonies for Burrowing Owls. This observation is the only time we saw a badger chasing a prairie dog.

Acknowledgements

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1. BALPH, D.F. 1961. Underground concealment as a method of predation. *Journal of Mammalogy* 42:423-424.

2. EADS, D.A., and D.E. BIGGINS. 2008. Above ground predation by an American badger (*Taxidea taxus*) on black-tailed prairie dogs (*Cynomys ludovicianus*). *Western North American Naturalist* 68(3):396-401.

3. MICHENER, G.R. 2004. Hunting techniques and tool use by North American Badgers preying on Richardson's ground squirrels. *Journal of Mammalogy* 85(5):1019-1027.

4. SCHWAB, E.R. 1978. An observation of badger predation on Richardson ground squirrels. *Prairie Naturalist* 10:60-61.

NOTES AND OBSERVATIONS ON THE ROSE STEM GIRDLER (*AGRILUS CUPRESCENS* MÉNÉTRIÉS) (INSECTA: COLEOPTERA: BUPRESTIDAE) IN SOUTHERN ALBERTA AND SASKATCHEWAN

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The rose stem girdler (Fig. 1) is a Palaearctic metallic wood-boring beetle (Coleoptera: Buprestidae) that has a wide range extending from Europe east into Siberia. In North America, it was first discovered in New Jersey. Within its range, this species varies considerably in color, punctation, and size. Because of this wide range and variation, it is not surprising that species, subspecies, and varieties have been variously recognized and that there has been considerable nomenclatural confusion. North American populations have been referred to as *Agrilus aurichalceus* Redtenbacher (see Bright for nomenclatural history in North America[1]), but recently, Jendek showed that *A. aurichalceus* is a junior synonym of *A. cuprescens*;[3] thus, the valid name for the species is *Agrilus cuprescens* (Ménétriés, 1832).

Figure 1. Adult rose stem girdler, dorsal aspect, collected 16 km south of Maple Creek, SK. Beetle length = 5.5 mm. David Larson

The rose stem girdler was first recorded from the prairies in 2003,[4] where at that time it was causing mortality in wild roses, namely *Rosa acicularis* Lindl. and *R. woodsi* Lindl., as well as in larger canes of *R. arkansana* Porter. It was not known how widespread the species was, but it is likely that the girdler reached the prairies through natural dispersal from the east rather than as an isolated introduction into SW Saskatchewan. The occurrence in native roses locally rather than in cultivated roses supports this. No subsequent comprehensive survey of the range of the species has been made, but during my travels I have inspected rose stands for girdled canes. Girdled, dead canes persist in

a stand for several years and can be observed year round; they are therefore good markers indicating the presence of girdlers. Since 2003, I have found girdled stems from the South Saskatchewan River south to the US border, throughout the Great Sand Hills, from Swift Current to Medicine Hat, Bow Island, Taber, and Lethbridge, and along the Cypress Hills from Duncairn Reservoir to Elkwater. This distribution simply reflects my travels; the species is likely more widespread.

Infestation of either dead or live canes is easily determined by removing a strip of bark from the lower half to two-thirds of the cane to expose the spiral larval tunnel. During the growing season, infected canes start to show effects of larval tunnelling by the leaves turning red prematurely, usually from mid-August onwards, which in dry years may be mistaken for drought effects. These leaves remain on the infested stems over winter and conspicuously mark recently killed stems, as can be readily confirmed by stripping off the bark to expose the spiral tunnel.

Bright reported that there was one generation a year and that after having completed feeding, a larva tunnels into the pith where it spends the winter and then pupates the following spring.[1] I previously reported not finding overwintering larvae in infected stems and speculated on whether they left the stems to overwinter in the soil.[4] However, I have subsequently found a few overwintering larvae in stems (Fig. 2), and they appeared viable even after the very cold winter of 2008-09.

Nevertheless, overwintering larvae are absent from the vast majority of stems, indicating either high larval mortality or that many larvae do overwinter elsewhere. A careful study of the life history of the species, with emphasis on causes and extent of mortality, would be most interesting. It is unlikely that natural parasites came with the species from Europe, but such tunnelling insects are often attacked by a suite of hymenopteran (wasp) parasitoids. The fact that such parasitoids are usually more specific to the habitat type than to the taxonomic affinity of their host[2] suggests that stem girdlers may have attracted a community of parasitoids that could be a significant cause of mortality. I have not noticed any sign of bark being ripped away from over mines, suggesting that predators, especially birds, do not seem to have discovered the larvae.

Generally, roses can be pruned with the stem branching below the point where it is severed; however, when a stem is girdled, the entire stem dies back to ground level rather than simply dying beyond the point of being girdled. This response means that within

Figure 2. Anterior half of body of the overwintering larva of the rose stem girdler in the pith of a rose. Specimen collected February 2009.

stands, those stems that are infested die. These are generally larger and older stems, and over several years, the result is a reduction in density and overall size of living stems, thus stands become lower and more open.

I previously made some speculations about the effects of the rose stem girdler on prairie plant communities.[4] Specifically, patches of dense shrubs would be reduced in size and density, and the reduction in the abundance of roses would allow grazing animals, especially cattle, to graze into and further reduce this habitat type. Unfortunately, I have no quantitative data on changes in the roses and associated plants within this region, although anecdotal observations provide some indication of what might be happening. I often visit the Great Sand Hills, parking on the access roads and walking to the active dune areas. Ten years ago, these walks required one to wear heavy clothing to protect against rose thorns, and the route involved following cattle trails. In more recent years, access has generally been over closely grazed grass, with the roses reduced to small patches of low, open bushes (Figure 3). As the roses died, cattle pushed into the patches, opening them up. Initially, there was bloom of various forbs, but the dominant vegetation seems to be reverting primarily to various grasses.

Riparian areas also show effects from loss of roses. On our farm, 16 km south of Maple Creek, roses once formed dense tangles in the riparian zone and in aspen clones. Many stems exceeded 2 m in height and some reached 3 m (Fig. 4). In 2000, it was very difficult to force oneself along a fence-line through an aspen stand because of the dense roses that equalled the fence in height. However, by the winter of 2008-9, it was possible to string sheep fencing along this fence-line, as the roses had collapsed into dead canes (Fig. 5). The dominant understory vegetation had become Smooth Brome Grass *(Bromus inermus)*.

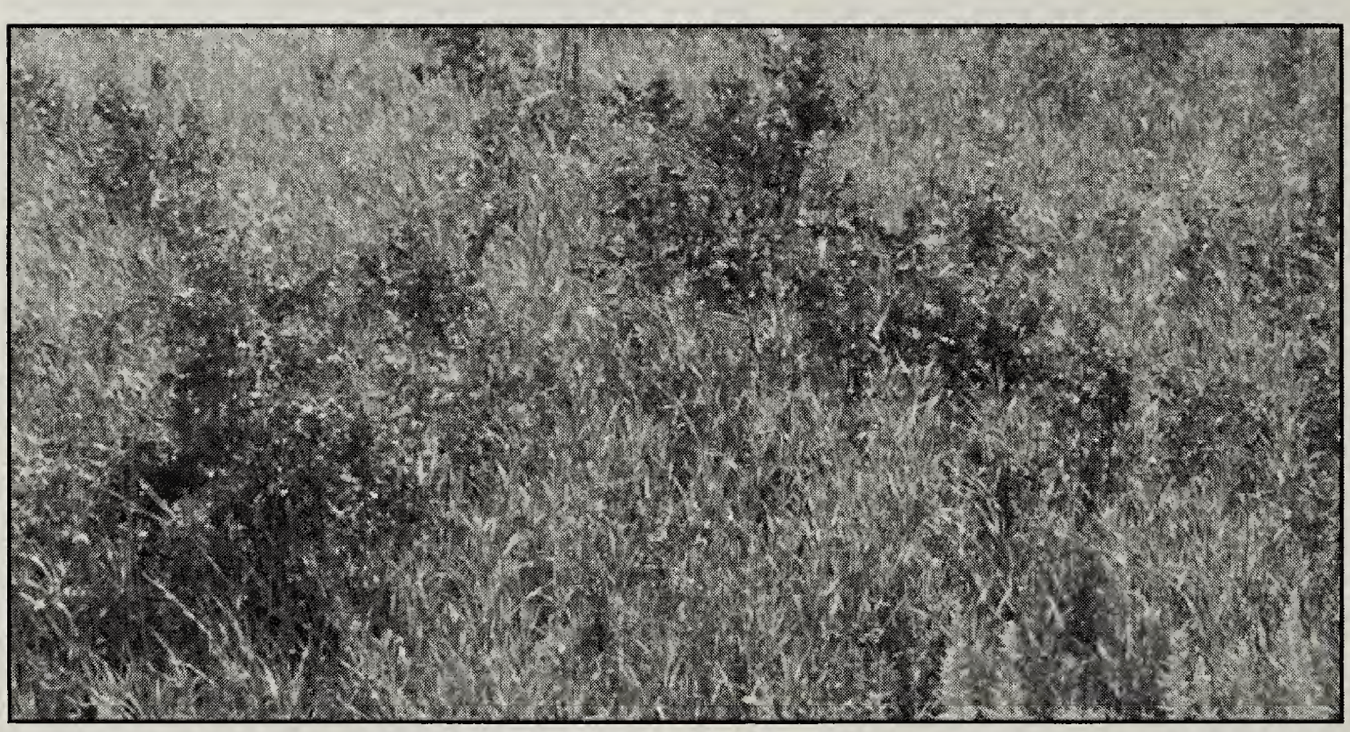

Figure 3. A dying patch of roses in sandhills 7 km west of Piapot, SK. Plants with reddish foliage (seen as dark patches in this photo) have been girdled and will die. A few bare and broken stems that were killed in previous years are barely visible, but most stems break or collapse the year after being killed and become obscured by grass incursion. This stand was probably almost a monoculture before stem girdler caused mortality.

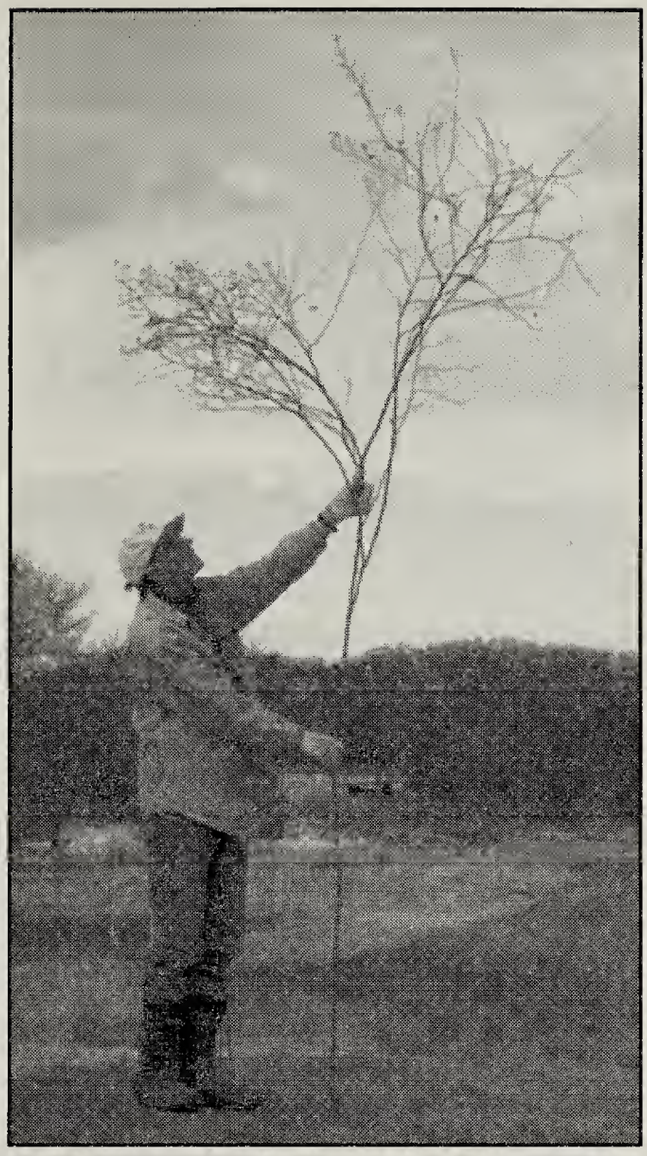

Figure 4. One of the last of the tall rose stems along Fleming Creek, 16 km south of Maple Creek. This stem bloomed and set fruit in the summer of 2008 but was dead in winter 2008-9, having been girdled in several places. Maximum height is 3.7 m.

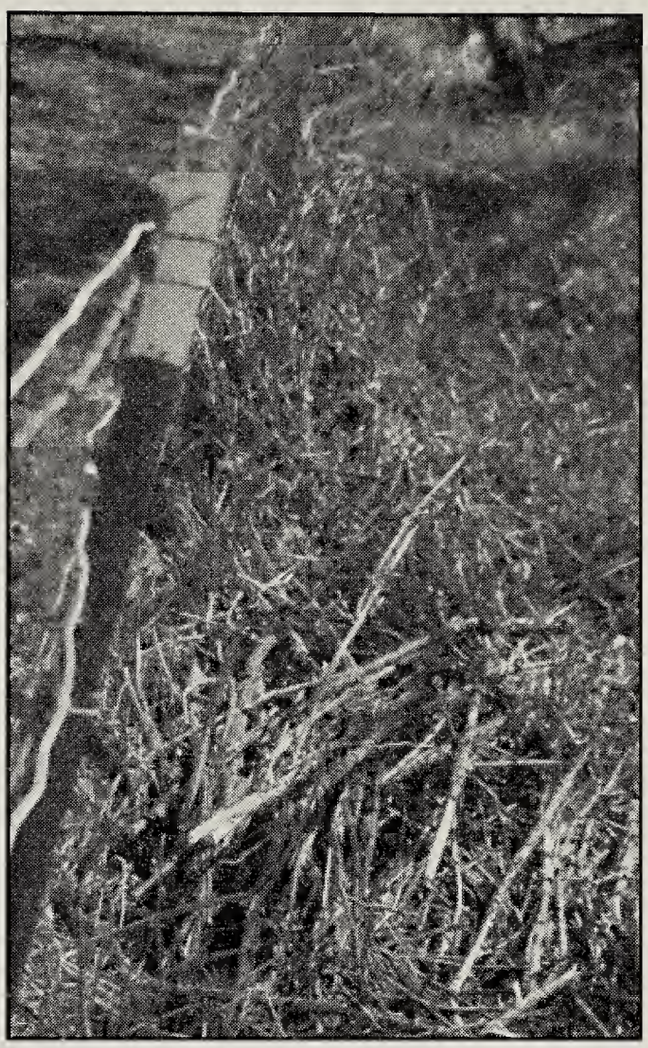

Figure 5. Dead rose stems still supported by a fence, 16 km south of Maple Creek, May, 2009. Virtually all stems were attacked by rose stem girdler larvae as indicated by the presence of one or more spiral mines etched into each stem somewhere along its length. Stems killed in the previous year are recognizable as they still bear dry, brown leaves.

It is likely that a variety of ecological ramifications of the rose stem girdler will be observed. Unfortunately, the opportunity to carefully document the effects of the beetle in southern Saskatchewan, and probably also southern Alberta, has been missed. However, the species may still be spreading, and naturalists in areas that presently have healthy stands of roses have an opportunity to monitor and document the impact of the species as its range expands.

1. BRIGHT, D.E. 1987. The insects and arachnids of Canada. Part 15. The metallic wood-boring beetles of Canada and Alaska (Coleoptera: Buprestidae). Research Branch, Agriculture Canada, Publication 1810.

2. GIBSON, G.A.P., J.T. HUBER, and J.B. WOOLLEY. 1997. Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera). NRC Research Press, Ottawa, ON.

3. JENDEK, E. 2003. Revision of *Agrilus cuprescens* (Ménétriés, 1832) and related species (Coleoptera: Buprestidae). *Zootaxa* 317:1-22.

4. LARSON, D. J. 2003. The rose stem girdler (*Agrilus aurichalceus* Redtenbacher) (Insecta: Coleoptera: Bupresridae), a new threat to prairie roses. *Blue Jay* 61(3):176-178.

BRAIN SCALE (*PSORA CEREBRIFORMIS*), A RARE LICHEN IN SASKATCHEWAN: A SECOND RECORD

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Brain Scale (*Psora cerebriformis*) belongs to the Interior Basin distribution centre as part of the western North American and Greater Sonoran Desert geographic distribution pattern, ranging north into the semiarid grasslands of southwestern Saskatchewan, Alberta, and British Columbia.[1,8] Blushing Scale (*P. decipiens*) has a broader distribution, occurring in the southern grasslands of Saskatchewan, Alberta, and British Columbia and arctic regions.[1,9] The possibility that Brain Scale could occur in the grasslands of southwestern Saskatchewan came to my attention after examining a geographical distribution map for the southern grasslands of Saskatchewan, Alberta, and British Columbia.[1]

This information raised the question of whether a specimen could be located to verify the presence of Brain Scale in southwestern Saskatchewan. Subsequent inquiries at various herbaria, including the Canadian Museum of Nature Herbarium in Ottawa, Ontario, and searches through the literature met with negative results until it was determined that Brain Scale was in fact deposited in the Canadian Museum of Nature Herbarium, but had been misidentified (R. Wright, Saskatchewan Ministry of Tourism, Parks, Culture, and Sports, personal communication, 2008). The specimen (collection number 630504) was collected on 18 April 1963 on an eroded slope near Fosterton, northwest of Swift Current, Saskatchewan, elevation 2750 ft (Fig. 1). It was misidentified as *Lecidea decipiens* (Ehrh.) Ach. by J. Looman, who made extensive studies of the grassland lichen flora during his tenure as a range ecologist at the Federal Research Station at Swift Current.[4,5,6,7] The specimen was subsequently revised to *P. decipiens* (synonym: *Lecidea decipiens*; Blushing Scale) in 1977, and again to *P. cerebriformis* W.A. Weber in 2008. Originally the specimen was accessed as *Lecidea* #1000 from staff collections (14 June 1966), but upon revision it was accessed as CANL 4913 (P.Y. Wong, Canadian Museum of Nature, personal communication 2008), suggesting that Looman did not deposit this lichen into the Canadian Museum of Nature Herbarium.

This information prompted a request for a loan so that the specimen could be re-examined and compared to specimens of Brain Scale from Arizona (Fig. 2a, see inside back cover) and Blushing Scale from Saskatchewan (Fig. 2b, see inside back cover), both in the author's private herbarium and in the published literature.[1,8]

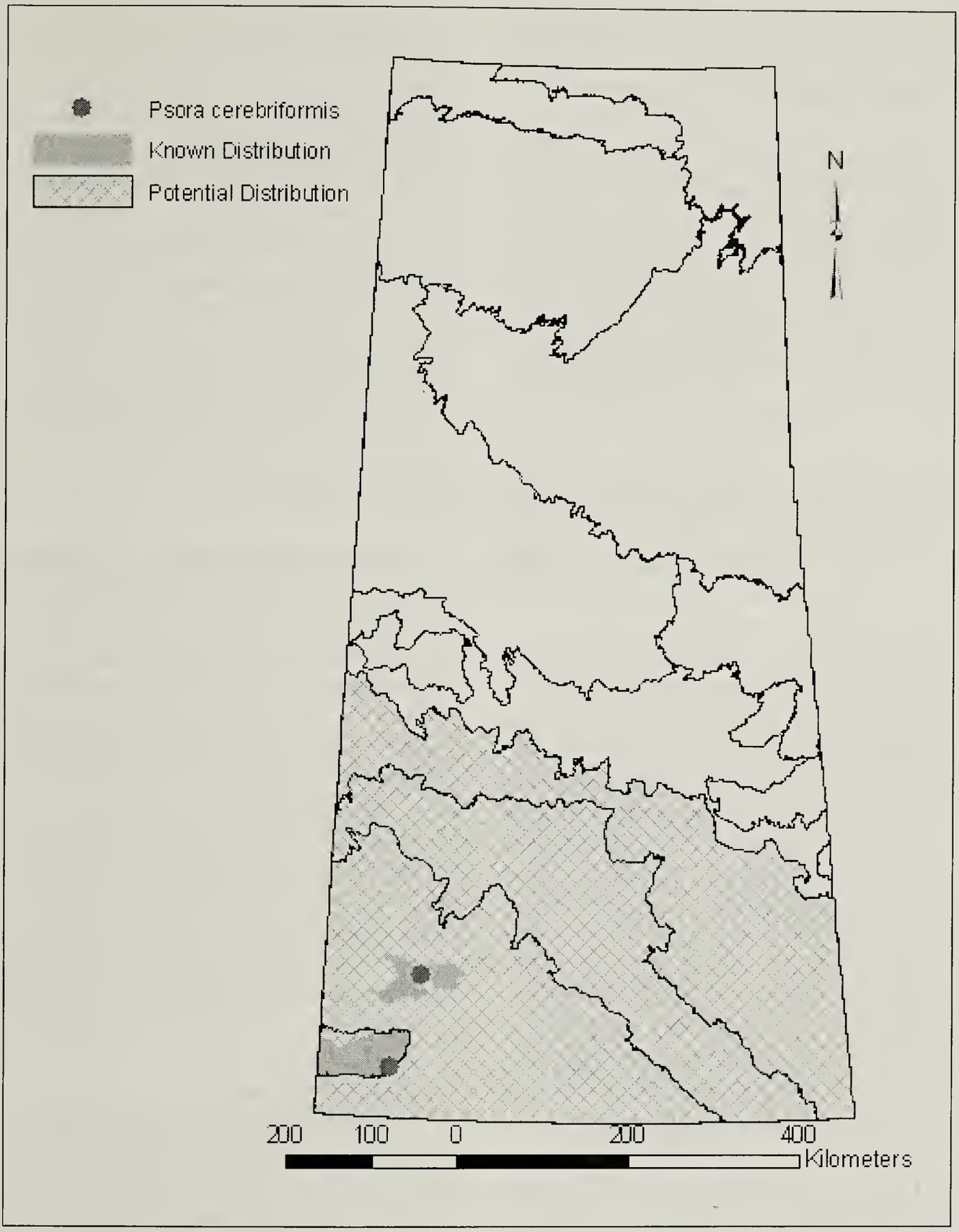

Figure 1. Ecoregions within ecozones in Saskatchewan. Dots show known occurrences, gray areas show potential locations, and cross-hatched areas show the potential distribution of Brain Scale.

Upon examination of the specimen, it became apparent that the material was indeed *Psora cerebriformis* (Brain Scale), but could be mistaken for Blushing Scale. The possibility of misidentification can partially be explained by similarities between Brain Scale and Blushing Scale on dry, calcareous soils in the *Xanthoparmelia chlorochroa* (Tumbleweed shield lichen) association (a climax unit dominated by one or more species having the life-form characteristic of the greater

climax [formation] unit to which the association belongs)[6,7,9] of southern Saskatchewan and Alberta.

Comparing the specimen to Brain Scale from Arizona and Blushing Scale from Saskatchewan, distinct anatomical and morphological differences were apparent. The vegetative body (thallus) of Brain Scale is usually pale yellowish-brown to olive-brown or gray, while Blushing Scale is orange-brown to brick-red or pink (hence its common name), although upon aging or decaying it can become dull rusty brown. The vegetative body of Brain Scale is also commonly strongly convex, but at times has rather flat scale-like lobes (squamules) similar to those in Blushing Scale, which are always flat with frayed, upturned white margins. Another characteristic differentiating these species is that Brain Scale mostly has a fissured vegetative body resembling a brain and is often heavily coated with a white powdery deposit (pruina), which gives it a characteristic 'frosted' appearance. Blushing Scale lacks such fissures but can be partially 'frosted.' Both species bear black marginal fruiting bodies. Another explanation for the poor state of the Fosterton specimen could be that the site of discovery is at the northern limit of its known geographic range.

The discovery site of Brain Scale at Fosterton is about 2,500 km north of Arizona, where is quite common.[8] A recent (5-6 August 2008) survey of the area where Looman collected this specimen did not result in additional records of this elusive and very rare lichen. This does not rule out the possibility that the species could still be found in this range of native hills, or in similar locations in the more semi-arid regions of southern Saskatchewan.

I made a second discovery (16 September 2008) of this elusive lichen (Fig. 2c, see inside back cover) on a northwest-facing upper slope with dry native prairie vegetation on calcareous soil, a few kilometers east of Eastend, about 100 km southwest of Fosterton. This suggests that within these known localities, the possibility exists of finding additional specimens through more intensive field surveys. These two collections undoubtedly will be of interest to those documenting and conserving rare and endangered lichen species of which little is known for Saskatchewan.

The preliminary ranking for lichens is based on the number of known occurrences. As such, Brain Scale is ranked S1 ("extremely rare": five occurrences or only a few individuals known)[2] for Saskatchewan and southern Alberta,[3] while its ranking in southern British Columbia is unknown. In order to increase our knowledge of the Saskatchewan lichen flora, ongoing and extensive field studies should be done to enhance the discovery of additional rare or endangered species, especially in the southern native grasslands.

Acknowledgements

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1. BRODO, I.M., S.D. SHARNOFF, and S. SHARNOFF. 2001. Lichens of North America. Yale University Press, New Haven, CT, USA.

2. DE VRIES, B. 2007. Saskatchewan Rare and Endangered Lichens. Preliminary Lichen Ranking List. Unpublished.

3. GOULD, J. 2000. Alberta Natural Heritage Information Centre Preliminary Lichen Tracking List. Alberta Environment, Edmonton, AB.

4. LOOMAN, J. 1962. Some lichens of Saskatchewan. *The Bryologist* 65: 294-304.

5. LOOMAN, J. 1964a. Ecology of lichens and bryophyte communities in Saskatchewan. *Ecology* 45(3): 481-491.

6. LOOMAN, J. 1964b. The distribution of some lichen communities in the prairie provinces and adjacent parts of the Great Plains. *The Bryologist* 67(2): 209-224.

7. LOOMAN, J. 1969. *Squamarina crassa* in Saskatchewan. *The Bryologist* 72(3): 412-413.

8. NASH, T.H. III, B.D. RYAN, C. GRIES, and F. BUNGARTZ 2002. Lichen Flora of the Greater Sonoran Desert region. Volume I (The Pyrenolichens and Most of the Squamulose and Macro Lichens). Lichens Unlimited, Arizona State University, Tempe, AZ, USA.

9. POLUNIN, N. 1960. Introduction to Plant Geography. McGraw Hill Book Company, New York, Toronto, London.

BIOLOGY OF DOWNY ARROW-WOOD (*VIBURNUM RAFINESQUIANUM*)

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Introduction

Downy Arrow-wood (*Viburnum rafinesquianum* [Schultes]) is a member of the honeysuckle family Caprifoliaceae. A rhizomatous, medium-sized native, this deciduous shrub is found in the eastern half of North America. It grows singly or in thickets along streams, in open woodlands, and on wooded rocky hillsides.

Ink drawings were made from plants in the field and from fresh specimens. The original drawings were donated to the Hunt Institute for Botanical Documentation, Pittsburgh, PA.

Study

This study took place in late 2005 and throughout 2006 in Winnipeg, Manitoba. It was initiated and funded by the author. The study area at 49° 52.399; 97°14.073 and 235 m elevation was an open Bur Oak (*Quercus macrocarpa*) woods in Assiniboine Park. Bur Oak, the only oak in Manitoba, had an average diameter at breast height (dbh) of 18 (range: 2–32) cm (n=122). In three 96 by 2 m random transects, 43 oak trees each occupied an area of 13 m^2.

Other vascular plants in the study area included Mountain Maple (*Acer spicatum*), Saskatoon Service-berry (*Amelanchier alnifolia*), Red-osier Dogwood (*Cornus alba*), American Hazelnut (*Corylus americana*), hawthorn (*Crataegus* spp.), Green Ash (*Fraxinus pennsylvanica*), Aspen Poplar (*Populus tremuloides*), European Buckthorn (*Rhamnus cathartica*), goldenrod (*Solidago* spp.), Poison Ivy (*Toxicodendron rydbergii*), and Nannyberry (*Viburnum lentago*).

Morphology

Plants were erect, with opposite branches and leaves. Before the first branches developed, young vegetative plants up to ca. 30 cm tall had two to several pairs of opposite, spreading leaves along the stem. Tall reproductive plants were somewhat leaning or nodding. Plant height and

width averaged 107 (12–217) cm and 51 (7–140) cm (n=78), respectively. Stem basal width (ca. 5 cm above ground) averaged 8 (1.3–17.2) mm. In thickets, the mean nearest neighbor distance was 21 (1–170) cm, with 48% of the plants within 1–10 cm of each other. The stem made a 90° bend 5–10 cm below ground and continued horizontally as a rhizome. The smooth brown rhizomes were 2–15 mm thick with fine branching roots 5–20 cm long.

Leaves

On 27 April, young hairy leaves within buds were covered with translucent, round, short, stipate glands on both sides and along the veins. Hairs were eglandular.

Mature leaf blades were simple, pointed, toothed, and spreading to drooping (Fig. 1). Dorsally (below), the blades were very hairy with white, ascending, curved to straight hairs 0.2–1.2 mm long generally pointing toward the apex. Most hairs were simple, although some were two- or three-branched. The blade margins were ciliate. Upper surface hairs were simple, widely scattered and 0.2–0.4 mm long. Hairs were more numerous on the blade near the petiole. The soft hairs gave a downy feel; hence the name.

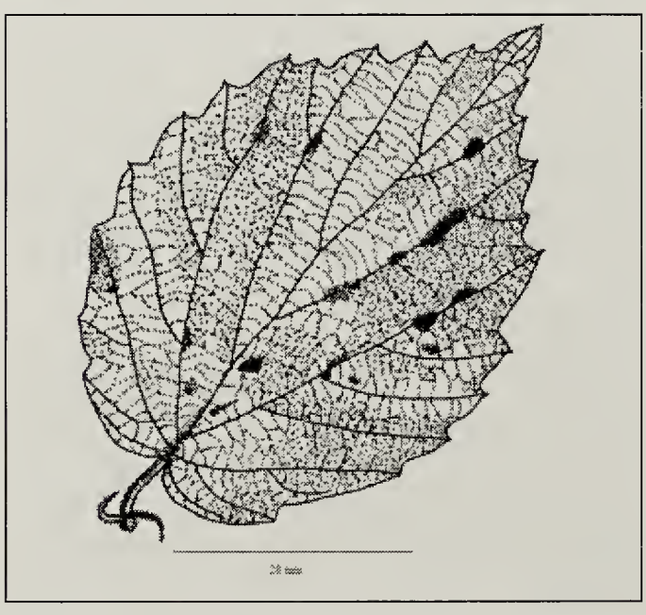

Figure 1. Leaf (ventral side) of Downy Arrow-wood, 21 September

Dorsally, the midrib (midway) was ca. 0.4 mm thick with the main side veins ca. 0.2 mm thick. The reddish purple blotches that develop in late summer along the midrib and veins distinguish this species.

New reproductive twigs usually had two (63%), one (35%), or three (2%) pairs of leaves (n=46). On 8 September, the internodal distance between paired leaves (top pair to the next lower pair) on new reproductive and vegetative twigs averaged 4.2 (1.3–7.8) cm (n=65). Fully developed leaves in August through early October averaged 6 (2.6–10.7) cm long by 3.8 (1.8–7) cm wide for a length to width ratio of 1.6 to 1 (n=167). The average width was 64% (37–102%) of the length. A leaf blade was 0.1 mm thick.

On 25 July, most blades were green but some had reddish purple blotches; by 4 August, some leaves were turning reddish; on 3 September, most blades were reddish and some leaves had dropped; by 22 September, some blades had their edges curled up and inward on the ventral side prior to falling; and by 14 October, over 95% of the leaves had fallen; a few overwintered on the shrubs.

Blades were rarely entire; most had 3–11 pointed teeth along each margin. Teeth were 7 (5.8–11) mm long in September (n=255). Teeth became indistinct and blunt near the base of the blade.

Petioles were about 8 (3–14) mm long (n=111), which was about 14% of the average length of a leaf blade. Petioles were hairy, 1–1.4 mm wide with a ventral groove ca. 0.3 mm deep that turned red by early August. The round dorsal side, bluntly ridged, remained green. On 3 August, the mean upper angle between opposite reddish petioles was 84° (40–140°; n=25).

Stipules (Fig. 2) were paired, curved, green with a reddish tip, 3.4 (1–13) mm long by 0.3–1 mm wide (not including hairs) by ca. 0.2 mm thick (n=148), attached 0.9–2.6 (–5.5) mm from the base of the petiole along the edge of the ventral (upper) groove. They were persistent, entire, flattened, pointed, wider above and tapered to their base. Hairs were mostly simple, <1 mm long, and rarely two- or three-branched. Stipules in early May were covered with stipitate, round, light yellowish green glands. One stipule 1–7 mm long developed below the normal pair and the base of the petiole 23% of the time. Rarely, four stipules appeared on a petiole. In early September, stipules were tan, erect, straight, and often parallel to each other.

Reproductive Twigs

On 12 May, new green to reddish-green reproductive twigs were mostly hairless or with some V-branched hairs, eglandular to slightly stipitate-glandular and with six or five low blunt ridges. Twig length was measured from the base of the bud from which it sprang to the top of the buds/flowers on several shrubs. On 1 June, with flowering underway, the twig length averaged 10 (5.4–21) cm by 1.1–2 mm wide, with 80% of the twigs 5.4–12.2 cm long (n=47).

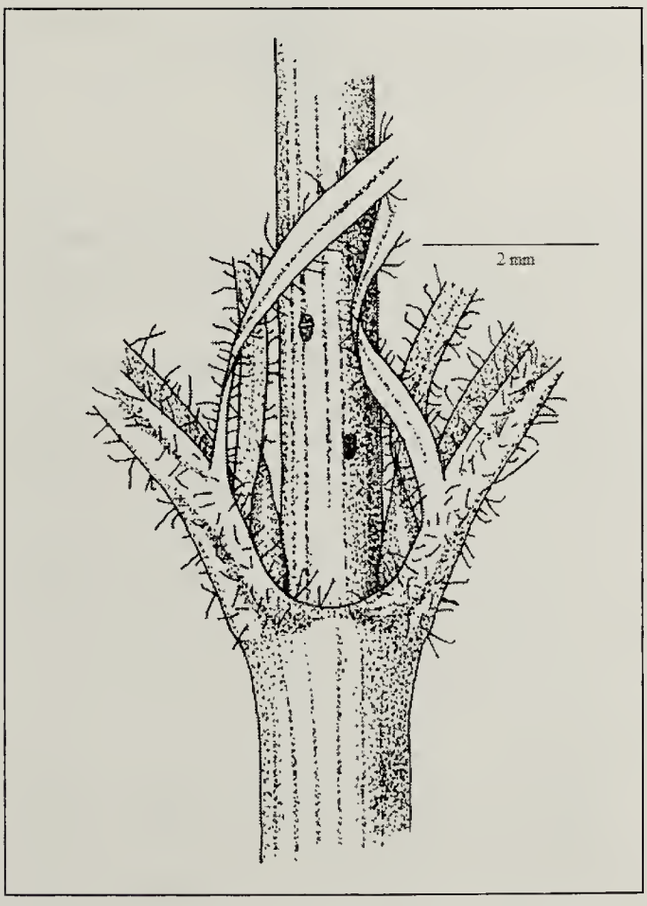

Figure 2. Bases of two petioles and four stipules, 2 June

On 19 September, the wide upper angle between opposite twigs averaged 85° (48–127°; n=42). Opposite branches or twigs often had one of the pair longer than the other.

Lenticels were ca. 0.4 mm long by ca. 0.3 mm wide, slightly raised, reddish-tan, mostly oval with their long axis parallel to that of the twig.

Older twigs, 1 year or more, were oval, brownish-gray, smooth, hairless, and 1.2–2 mm thick. On 14 October, leafless plants of seven selected shrubs averaging 151 (92–179) cm tall had an internodal distance between paired branches along the main stem from the base averaging 7.3 (2.5–31) cm (n=112). For selected plants, 183 (145–240) cm tall (n=25), the height from the ground to the first branch or paired branches was 75 (33–130) cm or 41% of a shrub's height.

Terminal and Axillary Buds

Reddish-brown terminal buds (Fig. 3), which form during the summer and overwinter, have two pairs of outer scales and two pairs of inner bracts. In early March, the buds were 4–5.2 mm long by 2–2.2 mm wide. Their lowest pair of outer, opposite, stiff scales was 2–3.3 mm long (including a 0.3–1.3 mm long awn) by ca. 3 mm wide (flattened) and wrapped around the base of a bud. Margins were ciliate with white hairs. The upper pair of outer scales was 4–5.2 mm long by 4.5–5 mm wide (flattened), thin, easily torn, reddish-brown, awnless, and with ciliate margins.

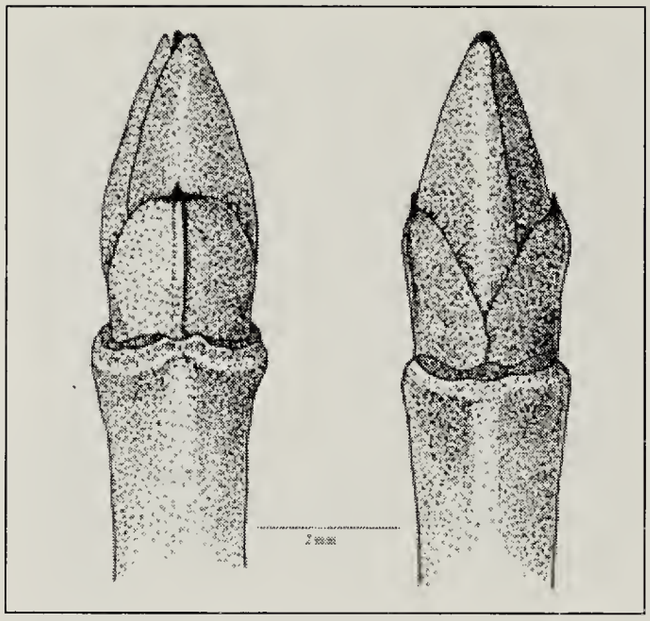

Figure 3. Terminal bud on short side twig, January

After a terminal bud expanded in April and eventually opened, two pairs of inner bracts became evident. The first exserted pair had a reddish brown blunt tip and was 6–10 mm long by 5–7 mm wide. On the outside (dorsal side) of the bract were white appressed hairs; inside (ventrally), the bract was hairless. Margins were white, hyaline, and ciliate. The top inner pair of bracts was 15–20 mm long by 5–7 mm wide on 20 April and slightly exserted. Their dorsal side was very hairy and stipitate-glandular; the ventral side was hairless. Shallow blunt apical teeth contrasted with the truncate and untoothed base. On 3 September, buds in axils of leaf petioles were 3-4 mm long by ca. 2 mm wide by ca. 1.5 mm thick with two outer pairs of ciliate scales.

Inflorescence

Peduncles were 5- or 6-sided, green, rarely absent, 2.8 (0.5–5) cm long by 1.1 (0.8–1.6) mm thick, densely stipitate-glandular in the apical half. The dark brown to blackish glands persisted. By mid-August, the peduncles were mostly reddish brown.

Subtending bracts of outer rays were 4–7.5 mm long by ca. 1 mm wide and fall quite early. Usually seven (4–7), pink, oval rays averaging 8 (2–20) mm long (n=29) ascended from the apex of the peduncle. Central rays had 4–20 flowers and outer rays each had 2–11 flowers. The mean number of flowers per ray was 6 (2–20; n=23).

Flower buds (Fig. 4a) on 12 May were in tight green clusters (cymes) ca. 15 mm long by ca. 10 mm wide (Fig. 4b). On 1 June, the number of flowers/buds per inflorescence averaged 47 (13–122).

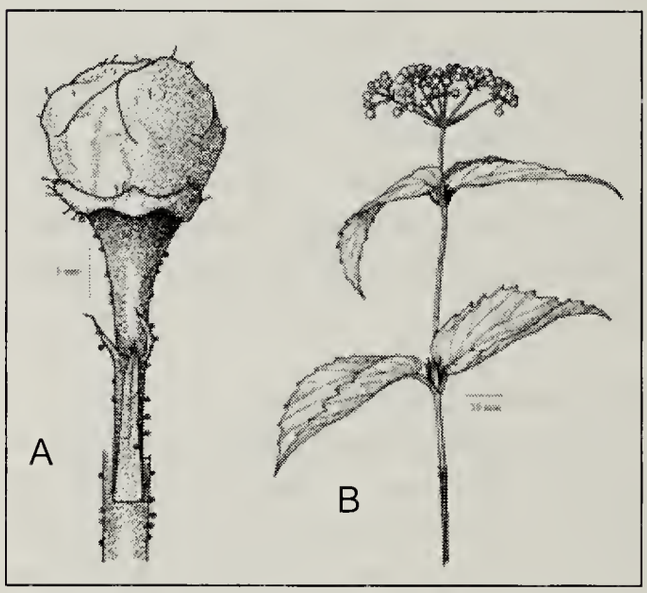

Figure 4. A) Pedicillate flower bud about to open, 30 May; B) twig with flower buds, 30 May

On 1 June, 18 (39%) of 46 inflorescences had 1–9 open flowers. On 6 June, inflorescences were oval from above and averaged 4 (2.5–4.6) cm long by 3.5 (2.3–4.5) cm wide (n=12). The long axis of the oval was parallel to the midribs of the opposite leaves at the base of the peduncle. On 8 June, about 95% of blooming was over and most corollas had fallen. Blooming lasted ca. 14 days from 27 May to 9 June.

Flowers

Flowers (Fig. 5) were perfect, white, hairless, odorless, and mostly pedicellate, although a few were sessile. They were 7–8 mm long (base of ovary to tip of anthers) by 6–7.3 mm

wide. A flattened corolla was 3–3.7 mm long. The single, included pistil was ca. 3.5 mm long. After anthesis, the corolla fell, exposing the calyx lobes at the tip of the fertilized, expanding ovary. The style had a round base 1.3–1.5 mm wide and was tapered to the pale, greenish-tan, flat, lobed, stigmatic tip that was 0.6 mm wide. The stigma quickly turned dark brown after anthesis.

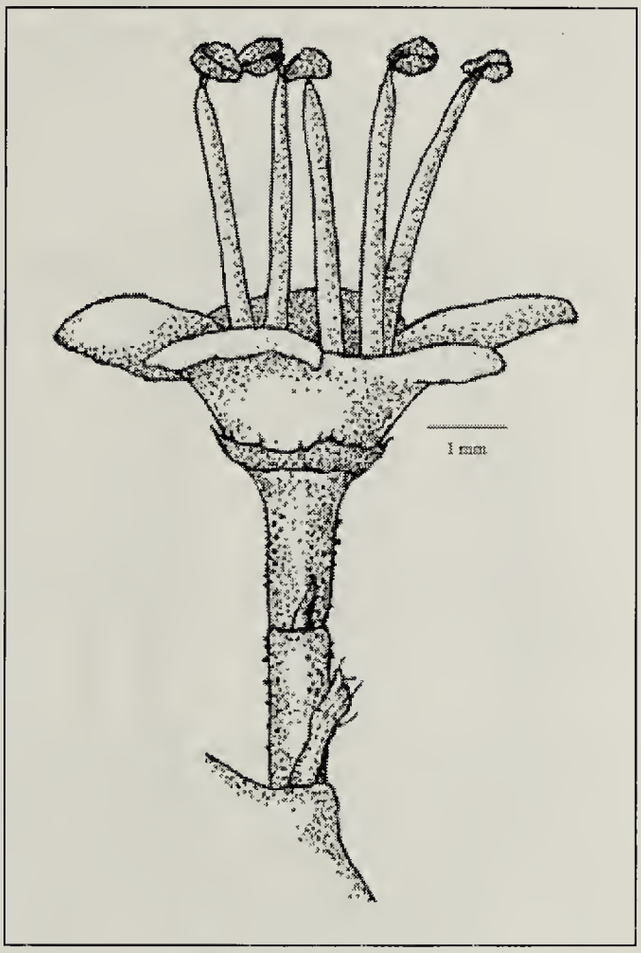

Figure 5. Open flower, 2 June

Subtending bracts of pedicels were 2–3.2 mm long by 0.3–0.6 mm wide, longer to shorter than the pedicel, entire, and hairy. Pedicels were 2.8 (0–7) mm long by ca. 0.5 mm thick and stipitate-glandular.

Subtending bracts of the ovary were paired, 0.5–0.7 mm long, entire, and tapered to a fine point. The ovary was 1–1.5 mm long by 0.8–1.2 mm wide, green, shiny with long green ridges and stipitate-glandular. Some young ovaries appeared frosty from numerous stipitate glands; others were almost eglandular. Glands were round, initially white, but quickly turned dark red and persisted on the expanding ovary.

Stamens (Fig. 6) numbered five and were exserted, hairless, attached to the base of the corolla tube, and dropping with it. Filaments were pale green in bud, becoming white, straight and tapered to the apices once the corolla opened. In flower, they were 3.5–5 mm long by ca. 0.4 mm wide with their bases ca. 0.5 mm apart. The filaments split apically, with each branch attached to a half-anther. Anthers were pale yellow and inverted in bud. In flowers, they were 1.2–1.4 mm long by ca. 1 mm wide. Spent anthers were golden brown, ca. 0.6 mm long and wide.

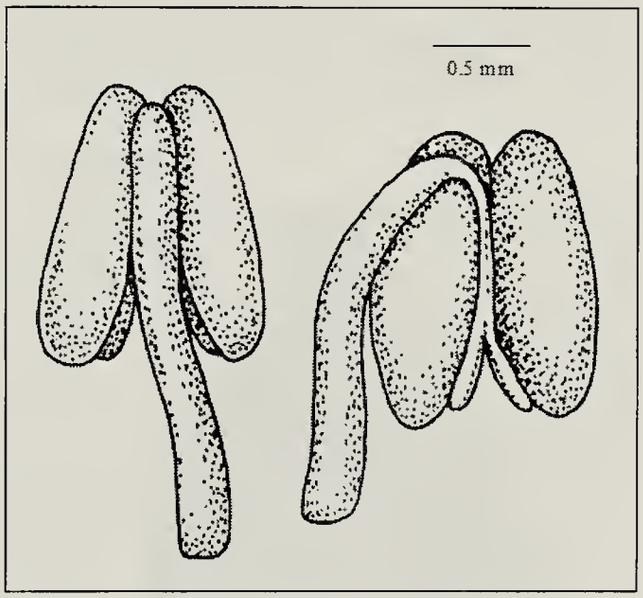

Figure 6. Stamens from a mature flower bud, 30 May

The ***calyx*** was tubular, five-lobed, and ca. 0.8 mm long by ca. 2 mm wide. The tube was 0.1–0.3 mm long; lobes were erose, 0.2–0.5 mm long by 0.6–1 mm wide, and slightly ciliate with simple hairs ca. 0.2 mm long. Green at first, the calyx quickly turned wine red after the corolla fell.

The ***corolla*** was tubular and five-lobed. In bud, the outer corolla lobes were pinkish green and wrinkled, and

gave the buds a bumpy appearance. The exposed lobes were adorned with a few scattered hairs and stipitate glands. The tube was 1.3–1.5 mm long with a circular basal opening 1.2–1.4 mm wide with a slightly erose edge. Lobes were round and 1.7–3 mm long by 2.2–3.8 mm wide.

Fruit

A one-stoned drupe developed from the single ovary in each flower. It enlarged quickly in June and was black and ripe by early August. Drupes were shiny, oval, and with dark reddish stipitate glands mostly at the two ends. Most drupes were ascending to spreading; some were drooping at the ends of rays.

On 5 April, I picked 39 fruits that had overwintered. They averaged 8.7 (7.6–9.7) mm long by 5.2 (4.1–6) mm wide by 4 (3–5) mm thick, and were black, wrinkled, dull, hard, and most contained a small hole from an insect (Fig. 7). At the apex, remnants of the style, stigma, and calyx formed a dark brown point 0.5–1.8 mm long.

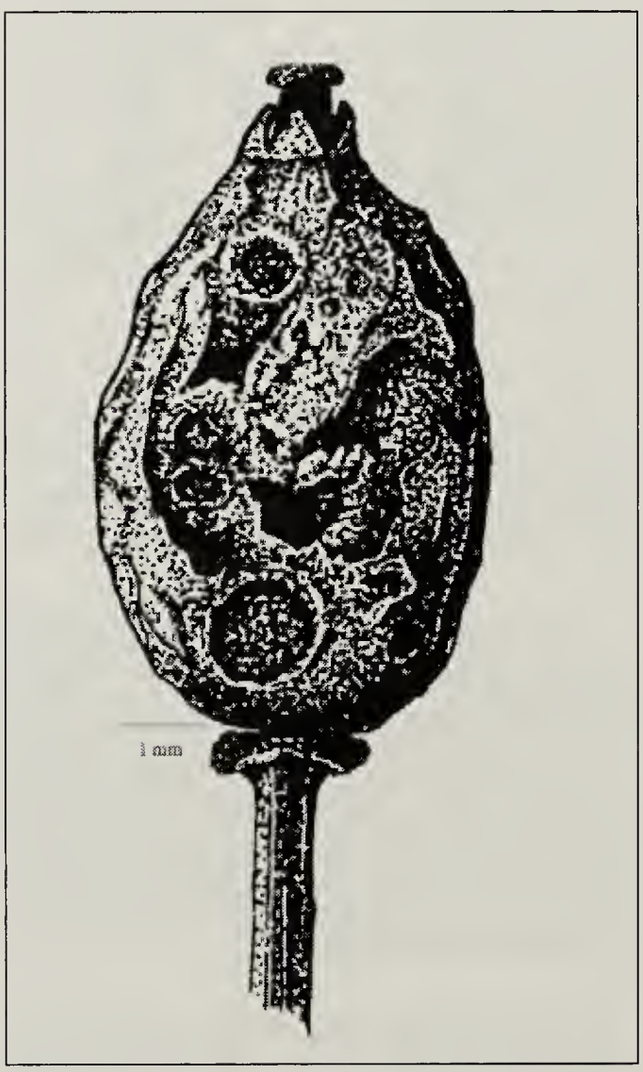

Figure 7. Overwintered fruit, 5 April

On 23 June, the average number of green fruits per cluster was 5 (0–17; n=130) compared to 47 flower buds on 1 June. On 18 August, the average cluster held 4 (1–14) fruits (n=200; Fig. 8). Clusters without fruit were not included in the above count in August.

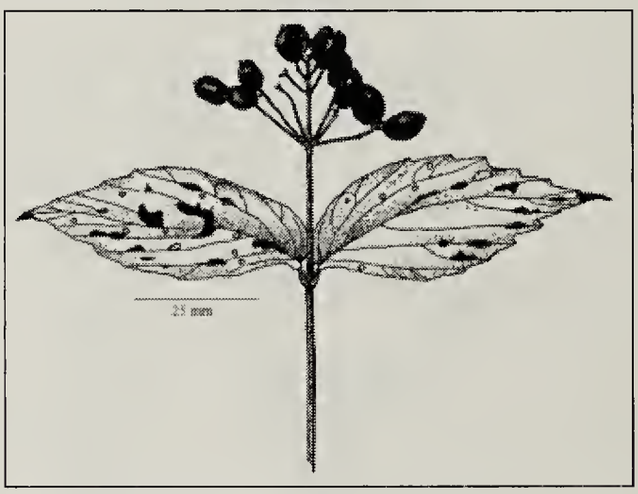

Figure 8. Cluster of ripe black fruit, 18 August

Ripe fruits on 22 September were on average 8.2 (7–11) mm long, 5.8 (5–6.7) mm wide, and 4.8 (4.5–5) mm thick (n=17; Fig. 9). The outer black coat (exocarp) was 0.1 mm thick with a fleshy, golden-brown mesocarp inside around the stone.

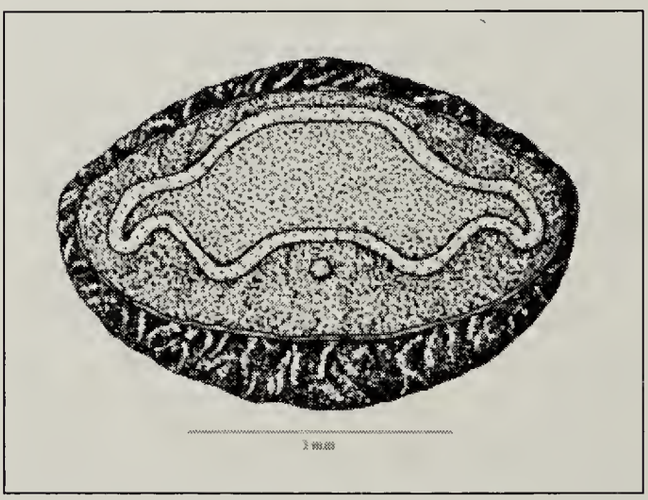

Figure 9. Cross-section of fruit showing stone and seed position and shape, 25 July

In September, 22 ripe drupes were picked, and their stones (one per drupe) were removed and cleaned (Fig. 10). The stones averaged 7.2 (6.1–8.5) mm long by 4.4 (4–5) mm wide by 2.5 (2.2–2.8) mm thick, slightly rough, and tan to golden brown. One side was convex with two full-length wide shallow grooves. The other side had a deep narrow groove near each margin and a wide shallow groove in the middle over which extended the narrow round funiculus.

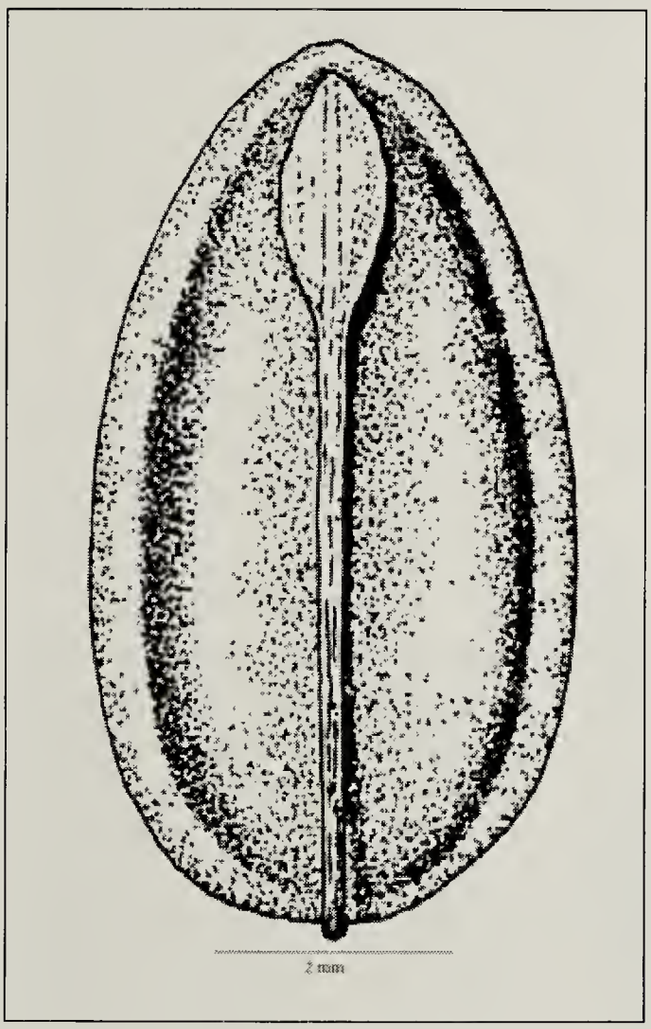

Figure 10. Stone from drupe, September

Damage from an unknown insect to the single seed inside each stone was common. For 22 stones, 17 (77%) had one circular hole ca. 0.6 mm wide. Of the 17 stones, 11 (65%) had a hole on the ventral side and 6 (35%) had a hole on the convex dorsal side. Most of the holes were concentrated ventrally on either side of the funiculus near the end of a stone.

Phenology of fruit (2006): On 21 June, developing fruits were yellowish green and 7–8 mm long (including style and stigma) by 4–5 mm wide and 2.5–3 mm thick; on 25 July, most fruits were green but some had dark reddish-brown areas; on 3 August, most remaining fruits were black and slightly shiny; on 3 September, most fruits had fallen or had been eaten by birds, and the shrubs displayed empty rays.

Seed

The seed was difficult to remove intact from within the hard woody endocarp of the stone. Only two attempts were made to measure the seed from one large and one small ripe fruit. Seeds were 5.8–9.2 mm long by 4.2–4.8 wide by 2–2.1 mm thick. A seed was light gray and firm.

Wildlife Use

No bird nests were built in arrow-wood shrubs. White-tailed Deer browsed young twigs with flowers in bud or blooming and when fruits were green in early June. Usually both pairs of leaves along with flowers or fruit were eaten. A Red-eyed Vireo ate some black fruit on 19 August.

Range

In Canada, Downy Arrow-wood grows in Manitoba, Ontario and Quebec. It may eventually be found along the eastern border of southern Saskatchewan. It extends to the eastern seaboard and grows in 30 US states (AL, AR, CT, DE, GA, IA, IL, IN, KY, MA, MD, MI, MN, MO, NC, ND, NH, NJ, NY, OH, OK, PA, SC, SD, TN, TX, VA, VT, WI, and WV). A range map of Downy Arrow-wood in Manitoba is shown in Fig. 11.

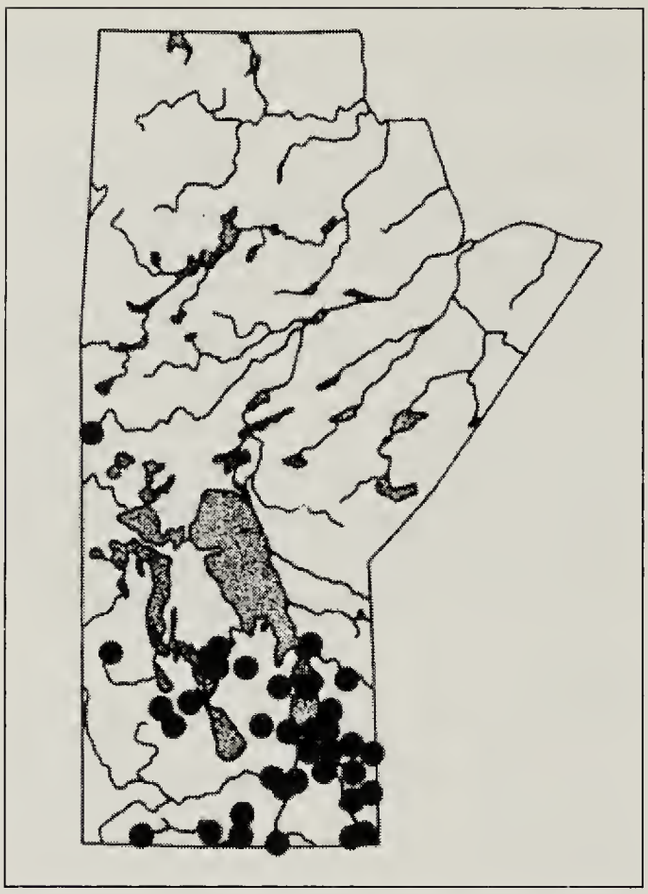

Figure 11. Dots show the distribution of Downy Arrow-wood in Manitoba

Acknowledgements

Diana Robson at The Manitoba Museum in Winnipeg provided access to a dot distribution map of Downy Arrow-wood in Manitoba. Anne Adkins, University of Winnipeg, provided a dissecting microscope.

NOTE: Tom Reaume's botanical book, *620 Wild Plants of North America*, fully illustrated with ca. 5,000 ink drawings, is available from the Canadian Plains Research Center Press, University of Regina, SK, or your local bookstore.

Remnants of an early June snowstorm in the West Block of Cypress Hills Interprovincial park. While we often think of climate change producing warmer and drier conditions in the prairies, more variable weather is another possible outcome. Nesting Western Bluebirds, Tree Swallows, and Sprague's Pipits likely had a hard time keeping their eggs warm during this cold wet period, while the bats that we were studying remained deep in torpor over a number of days.

- Mark Brigham, *Department of Biology, University of Regina, Regina, SK; E-mail: <Mark.Brigham@uregina.ca>*

THE W. P. FRASER HERBARIUM OF THE UNIVERSITY OF SASKATCHEWAN: PAST, PRESENT AND FUTURE

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Introduction

The W. P. Fraser Herbarium, whose official acronym is SASK, as registered in the Index Herbariorum,[3] is an institution devoted to the study of the Saskatchewan flora. In addition to preserving well-documented voucher specimens representing the province's past and present legacy, SASK's primary mission is to provide an accurate taxonomical, geographical, and historical representation of all native and naturalized plants occurring in Saskatchewan. For almost 100 years, SASK has accumulated information regarding the province's natural plant resources. In 2004, SASK was ranked among the top 15 herbaria in the country.[1] As of 24 March 2009, the collection included 178,624 specimens featuring vascular plants, bryophytes, and lichens. The wealth of information stored in our biological collection is available to systematists and can be used to analyze quantitative data in multiple traditional ways or via biodiversity informatics programs.

The significance of the SASK collection to Saskatchewan biodiversity is evident. The flora of Saskatchewan is essential for scientific research in the areas of plant taxonomy, systematics, and management of botanical collections. However, the lack of qualified personnel in taxonomy and nomenclature is a common problem throughout the world. Indeed, while numerous persons have training and expertise in plant identification, few of them possess the necessary understanding regarding the taxonomic, nomenclatural, and typification rules required in monographic revisions. The shortage of qualified personnel in these areas reflects, in part, the lack of a formal flora book for Saskatchewan, with the exception of the 2003 checklist by V.L. Harms[2] and the Flora of Saskatchewan Association (FOSA) efforts to produce a provincial flora involving the latest estimation by Harms of ca. 1,600 Saskatchewan species (ca. 1300 native plus approximately 300 exotic species).

Within the educational scope and training of highly qualified personnel, SASK and the University of Saskatchewan are the main learning centres for plant taxonomy, plant systematics, biodiversity, and management of botanical collections. Year round, the herbarium supports undergraduate and graduate-level courses in botany in the departments of Biology and Plant Sciences and reaches out to other educational institutions and the local community. SASK promotes career and work education programs with various local high schools by hosting and educating students for short periods. The herbarium also assists the local community as a part of the museums network and provides workshops, public tours, lectures, and exhibits. As a facility dedicated to the preservation

and long-term access to research data, the herbarium is an essential information resource centre for students, professionals, amateurs, and the general community.

History and collection development

SASK is a young institution compared to other Canadian herbaria. The facility is part of the Plant Sciences Department (University of Saskatchewan) and was named after William P. Fraser, who established the herbarium in 1925, building it with collections made by Thomas N. Willing from about 1910 to 1913. Many of Fraser's own collections were added to the Willing nucleus along with those of R.C. Russell (Fraser's colleague in the Canada Agriculture Station, then called the Dominion Laboratory of Plant Pathology).

Between 1919 and 1925, Fraser and Russell had started a herbarium in the Laboratory of Plant Pathology (later to become the Agriculture Canada Saskatoon Experiment Station), which was merged with SASK in 1981. The merger of Agriculture and Agri-Food Canada, Swift Current (SCS), with SASK in the early 1990s brought in more early Canada Agriculture collections. During the 1930s, Fraser served as a mentor through correspondence with August Breitung, a young amateur from MaKague, SK. These specimens, or duplicates of these, are the Breitung collections with the poor hand-written labels we see in the herbarium vouchers. About a decade later, when Breitung accepted a job at the Agriculture Canada Herbarium (DAO) in Ottawa, he took his own collections with him. In exchange, SASK received about 1000 specimens from DAO, representing the Breitung collections now seen in the SASK collection.

Robert T. Coupland and his graduate students contributed specimens from the late 1940s through the 1950s and 1960s. Also, numerous collections were made by Andy Skoglund, who was Coupland's

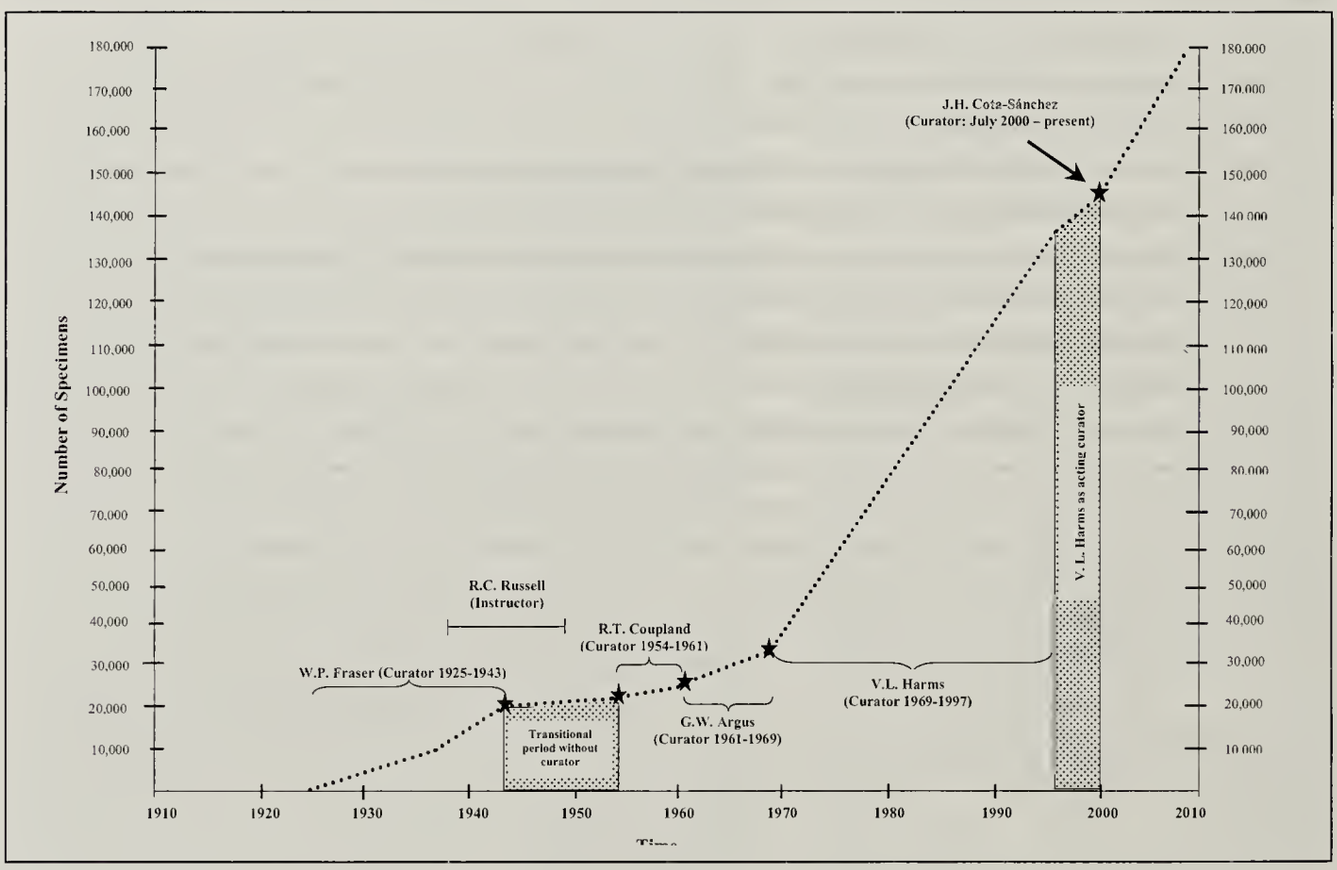


Figure 1. Graphic history of the collection growth and development and chronology of curators in the W. P. Fraser Herbarium (SASK).

primary technician during his grassland studies in the 1950s and 1960s and who remained as a departmental assistant, including the role of herbarium technician, until his retirement in 1978. Ralph Dix and his students added vouchers from 1960 to 1966. Later, J. Stan Rowe, who replaced Dix, and his graduate students added collections from the late 1960s to early 1980s. In the last 50-60 years, SASK collection development has been possible due to leadership of different curators as well as several devoted Saskatchewan-based botanists, who are included in the next section. The progression in SASK's collection growth to date is shown in Fig. 1.

Main and historical collections hosted at SASK

With collections covering 125 years, SASK has comprehensive chronological, historical, taxonomic, and geographic coverage of provincial plants, except those from remote, inaccessible areas still in need of botanical explorations (Fig. 2). The type collection and the rare plant database (RPD) are among SASK's representative collections. The type collection includes 47 specimens[1]. The RPD contains 9,656 records with voucher information of taxonomically evaluated rare species housed in the SASK collection and other herbaria. The list includes provincially rare (presumed extinct, endangered, threatened, and most "species of concern" and provincial "candidate" species). In addition to the Saskatchewan Data Centre, no other research institution has such comprehensive information on geographic and taxonomic categorization and rarity status of Saskatchewan plants.

SASK also hosts the main collections of the most significant

Figure 2. An example of the historical specimens housed in the W. P. Fraser Herbarium (SASK). Northern Green Orchid Platanthera hyperborea *collected by Fraser from Prince Albert National Park, SK, in 1933.*

Saskatchewan-based collectors, spanning the time period of ca. 1900 to the present. Two collections in particular, those of John Macoun and Thomas N. Willing, have historical value at SASK because they stand as the earliest records of the provincial flora. The Macoun collections came to SASK via exchanges with the Canadian Museum of Nature (CAN) and date from the latter 1890s and early 1900s. Those of Willing were collected in Saskatchewan between 1910 and 1913 or maybe longer. In the same way,

Table 1. Largest collections hosted at SASK. Estimates were based on SASK Accession Book, which dates back to 2 May 1968. Note that exchange materials and accessions of herbaria merging with SASK were usually recorded in bulk form rather than identifying special collections or main collectors, making some numerical assessments difficult.

Collector Name	Estimated # of Accessories	Collection Information
Vernon L. Harms	35,000	From numerous expeditions throughout Saskatchewan from ca. 1993 to 2008.
John H. Hudson	6,500	Cyperaceae, in particular *Carex* of Saskatchewan. From the 1960s to 2005.
Bernard Boivin	1,700	Various plant families.
George W. Argus	Unknown	Contributed the majority of the *Salix* collections, as well as numerous vouchers of plants collected on various expeditions in northern Saskatchewan in the 1960s.
Jan Looman	Unknown	Collected many of the 24,405 accessions from the Agriculture and Agri-Food Canada Herbarium and Semi-Arid Prairie Agriculture Research Centre at Swift Current, SK (SCS), which were merged with SASK in 1991.
R. C. Russell	Unknown	In the mid-1980s, ca. 7900 specimens of the Can Ag Russell Herbarium were merged with SASK, and many of these were Russell's.
Robert T. Coupland	1,000-2,000	Various plant families.
August J. Breitung	Unknown	SASK received numerous of his duplicates from DAO.
William P. Fraser	Unknown	Fraser collected perhaps one-third to one-half of the ca. 2000 specimens of the original Fraser collection.
Judy Ternier	1,000	Note: the J. and J. Heilman Churchill R. collections are also J. Ternier's, made with Jim Heilman.

those of August Breitung made in the 1930s are significant to SASK because they represent early records of the provincial flora and because after his death on 27 September 1987, Breitung left a trust to SASK, which has been traditionally used to support studies of the flora of Saskatchewan. The collection of George Ledingham, who was associated with Fraser in the 1940s, is also considered historical. A list of the major contributors to SASK collection growth in terms of number of specimens per collector is provided in Table 1.

SASK curators

The curatorship of the herbarium is a joint position between the Departments of Biology and Plant Sciences. Hence, in addition to the administration and curation of the

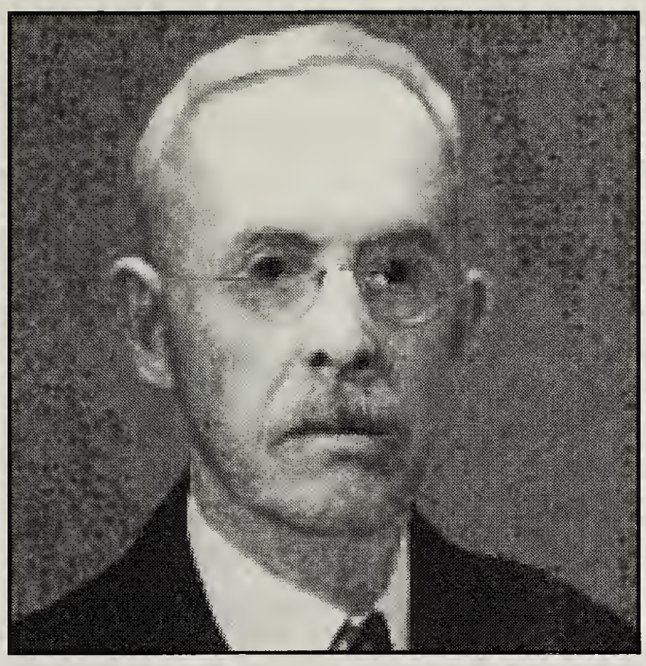


Figure 3. Portrait of William P. Fraser. Date unknown.

facility, curators are responsible for teaching undergraduate and graduate courses in the areas of botany and plant systematics. A chronology of the herbarium embraces the following curators.

William P. Fraser (Fig. 3) became the first curator of SASK in 1925 when he was appointed as a professor of biology. He maintained his collections in the biology department until his death in 1943.

In 1954, Robert T. Coupland was appointed in the College of Agriculture as a plant ecologist and weed specialist. He rescued Fraser's collections and transferred to the Department of Plant Ecology (College of Agriculture). Coupland devoted his time to the curation of his own collections and the Fraser collection until he left the curatorship in 1961. George W. Argus became curator in 1961 and held this position until 1969. During his curatorship, the Fraser specimens and Coupland's plant ecology collections were fully merged, and our facility became officially recognized as the "W. P. Fraser Herbarium."

In 1969, Vernon L. Harms (see Fig. 4) became the curator until his retirement in 1997. He then carried on as acting curator until June 2000. During his curatorship, SASK experienced a substantial collection growth, due in part to the merging of the Russell Herbarium (Agriculture Canada in 1986) and Swift Current Herbarium (in 1991) with SASK. These two herbaria contributed 32,200 collections with 7,800 and 24,400 specimens, respectively, in addition to other smaller collections, which also merged with SASK.

In July 2000, J. Hugo Cota-Sánchez (see Fig. 4) was appointed as a professor in biology and curator of the herbarium. Since then, SASK has seen a collection increase of 29,588 specimens and has implemented computerized technology, which is described in the following section. A historical progression of the herbarium curatorship and collection development is shown in Fig. 1.

Present and future directions

Traditionally, SASK has been and will continue to be an institution devoted to preserving and contributing to the

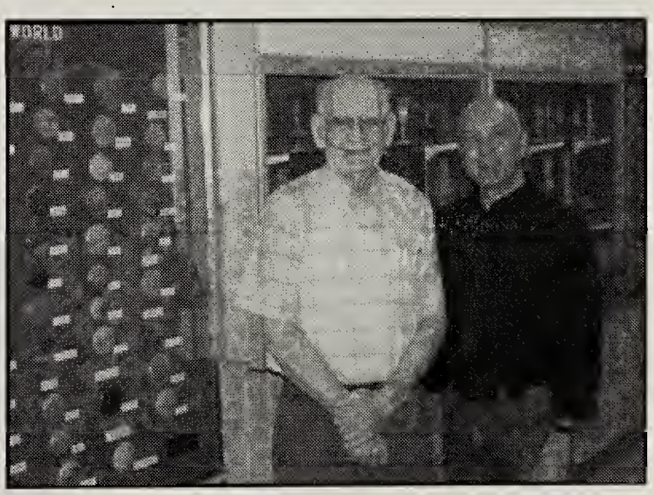


Figure 4. Vernon L. Harms (former curator, left) and J. Hugo Cota-Sánchez (current curator, right). In the background can be seen part of August Breitung's World Wood Collection.

knowledge and cataloguing of the local and Canadian flora (Fig. 5). Our museological activities involve collection development, loans and exchange programs, and research and public support, among others. However, in the last 8 years, SASK has undergone several important changes while maintaining its traditional endeavors. In this respect, the current curator is leading the facility's new research directions in biodiversity informatics, a research program built with grants funded by provincial and national agencies, such as FOSA, Museum Assistance Program, Canadian Heritage Information Network, and the Canadian Foundation for Innovation.

SASK's biodiversity informatics research program entails the management of the collection using *Specify* software to make the specimen label information available online. *Specify* is an interoperable platform for sorting/managing biodiversity and natural history collections and is used in other herbaria/museums around the world. SASK is one of the leading Canadian institutions implementing *Specify* in its biodiversity-based research program, which will strengthen provincial and national taxonomic expertise to ensure the long-term conservation of Canadian biodiversity.

SASK's ongoing efforts include the development of an electronic database based on information of the ca. 180,000 collection specimens, which are the foundation for nomenclature and are permanent records of our natural heritage serving as a testimony of the existence of the Saskatchewan plant species in the wild. This database will contribute valuable datasets relevant to taxonomy, biodiversity, conservation, and environmental biology. Specifically, it will provide concise systematic information documenting the province's past and present plant diversity, which, in conjunction with present and future botanical

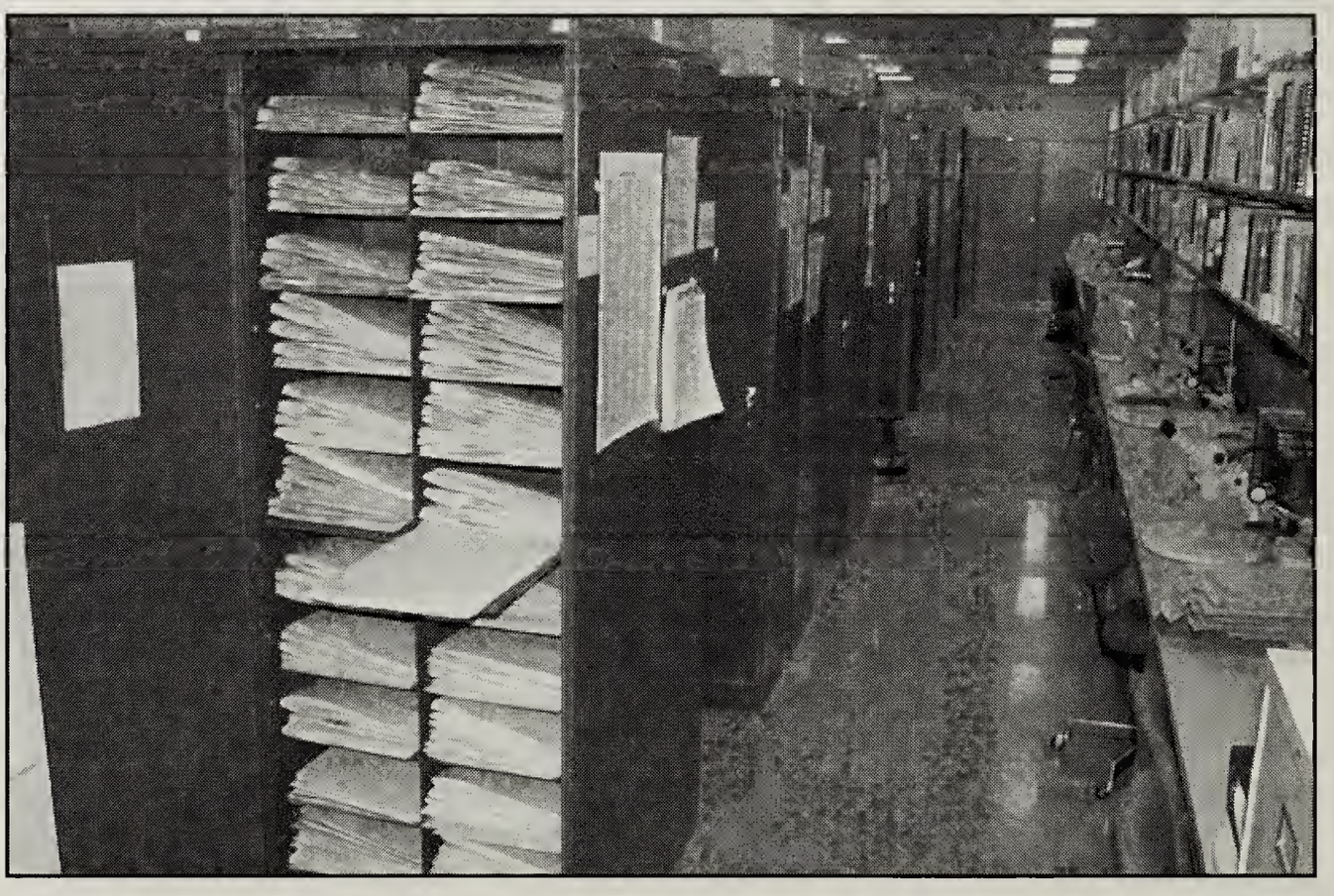


Figure 5. General view of the W. P. Fraser Herbarium (SASK) collection, which contains nearly 180,000 specimens.

explorations, will enhance the current knowledge of the province's plant resources. In addition to enriching the management and delivery of the SASK botanical collection, the database will expand our knowledge regarding plant history, species diversity, and distribution by allowing us to target hot-spot areas to prioritize the holistic study of species and propose habitats/areas for conservation. Overall, the database infrastructure will enable a synergistic cross-analysis of biodiversity data from each group of plants and will greatly enhance our capacity to evaluate ecological and environmental links.

Other major improvements in the herbarium include the use of new preservation and preparation techniques of voucher specimens for collection growth and development as well as new computers and ancillary supporting digital equipment. For instance, the current preparation and preservation of specimens for the collection is being made using environmentally friendly chemicals, such and non-toxic glue and the elimination of moth-balls made of naphthalene, which has a characteristic unpleasant smell and causes respiratory problems. The herbarium research support now includes computer stations in addition to SASK's own server and computers, which have been established to facilitate the updating and the backing up of the database while assisting research and collection access to the scientific and general community. Also, a flatbed scanner for digitization of voucher specimens has been installed in the research area. The computer workstations are strategically located in the herbarium collection room and are fundamental for the data entry and online delivery of the collection. We invite our readers to visit our website (http://herbarium.usask.ca/) and learn more about the herbarium. Our website provides a wealth of information about Saskatchewan plant resources and other data. A new digital gallery and a list with botanical descriptions of the provincial rare species will be launched later this year.

In summary, present and future goals of the biodiversity informatics program at SASK include but are not limited to the following: 1) develop the collection and infrastructure, 2) facilitate the mobility of existing data stored in our biological collection, 3) digitize the herbarium collection and develop a geomapping system for the geographic location of voucher specimens, 4) increase research efficiency for internal and external users by providing fundamental plant and vegetational data that can be used to address a number of problems, such as rarity status and range of invasive and native species, and effect of environmental and landscape changes on species distribution, and 5) provide basic information and tools for diverse biodiversity modeling programs dealing with the flora and vegetation of Saskatchewan. To achieve the above objectives, SASK became part of a partnership known as the Canadian University Biodiversity Consortium (CUBC/Canadensys). The ultimate goal of this network is the online documentation of Canadian biodiversity and represents a synergistic interinstitutional effort to overcome the problems faced by the global decline of taxonomic expertise and the need for rapid identification and organization of biodiversity data. The interoperability of the biodiversity databases in Canadian institutions will facilitate and render our biological collections and their information more accessible to researchers throughout the world.

In conclusion, the herbarium biodiversity informatics research

program will produce useful electronic catalogues of the provincial flora, because the SASK collection remains a fundamental, rich source of historical, ecological, geographical, morphological, and taxonomic data. SASK databases will greatly facilitate the extraction of such data for use in a wide diversity of taxonomic and conservation-oriented research at the provincial and national levels.

1. COTA-SÁNCHEZ, J.H., R. OLSON, and J. HARALDSON. 2004. The type collection of the W. P. Fraser Herbarium. *Polibotánica* 17:131-138.

2. HARMS, V.L. 2003. Checklist of the Vascular Plants of Saskatchewan and the Provincially and Nationally Rare Native Plants of Saskatchewan. University Extension Press, University of Saskatchewan, Saskatoon, SK.

3. HOLMGREN, P. K., and N. H. HOLMGREN. 1998. Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/ih/

THE GEORGE F. LEDINGHAM HERBARIUM, UNIVERSITY OF REGINA

ELIZABETH BARKER, LB 152, University of Regina, 3737 Wascana Parkway, Regina, SK, S4S 0A2; E-mail: <barker1e@uregina.ca>

The George F. Ledingham Herbarium was founded in 1945 by Dr. George Ledingham and was named after him in 1990. George remained an active curator of the Herbarium until well into his 90s and, when he became unable to tend the Herbarium daily, continued to visit occasionally.

The Herbarium houses approximately 50,000 vascular plant specimens, 10,000 bryophytes, and 10,000 mosses, collected from 1901 to the present. A special Grasslands National Park collection, comprising a few hundred specimens, was set up by George, to whom the Park project was near and dear. A new (2008) addition to the Herbarium is a number of plants collected at White Butte by Inga Hiiesalu, a Master's student supervised by Dr. Scott Wilson of the University of Regina.

One Herbarium cabinet is filled with *Astragalus*, a genus on which George did a great deal of research. This genus, which belongs to the family Fabaceae, includes numerous species of milkvetch, locoweed, and goat's-thorn. A particularly interesting specimen is *Astragalus ledinghamii*, collected by George in Iran in 1965 and named after him by R. C. Barneby (Fig. 1). George noted that in the area where he collected *A. ledinghamii*, the land was potentially fertile but barren from overgrazing. "Now the goats (millions), sheep, donkeys [and] camels travel about eating every blade of grass as soon as it comes out of the ground. The grass never matures seed and soon disappears," he wrote. One Iranian told George that he had come 20 years too late because the large, thorny species of *Astragalus* in the locale were being used for firewood.

During the winter of 2006, George attended a coffee social held by the Department of Biology. A few years earlier, as an undergraduate student taking a course in plant taxonomy, I had studied specimens in the Herbarium, profiting from George's expertise and enjoying his friendliness and his enthusiasm for plants. I was happy to see him again and sat down to chat with him. I don't think George knew who I was, but he was determined to

Figure 1. Herbarium specimen of Astragalus lediнghamii, *collected by George Ledingham in Iran.*
Don Hall, University of Regina.

express his concern for the Herbarium to anyone who would listen. I promised him that I would see that the Herbarium was looked after. Sadly, George passed away in October of that year*, shortly after making a last trip to the Herbarium for a photo session with Don Hall, who was preparing an article that appeared in the University of Regina's *Degrees* magazine later that month.

During the last 3 years, with assistance as needed from Dr. Mary Vetter, I have responded to requests for plant identification and information about plant mutations from members of the general public, provided information about locations of rare specimens to conservationists, and processed loans of specimens to researchers. Visitors to the Herbarium have studied Saskatchewan plants, particularly rare species, to aid in their field work.

Increasing petroleum and natural gas (PNG) activity in the southern part of our province has a profound impact on prairie plants. Some of the conservationists who are responsible for ensuring that land disturbed by PNG activity is restored as nearly as possible to its pre-disturbance condition have expressed the concern that they are able to identify only the common plants. Working with herbarium specimens is an indispensable aid to identification, and we encourage workers to visit the George F. Ledingham Herbarium to familiarize themselves with rare species. We feel that this is an important role for the Herbarium to play in conserving Saskatchewan vegetation and welcome any opportunity to open the Herbarium for use.

We are interested in building a database of Herbarium specimens using Specify software, which is designed for that use. One of the George F. Ledingham Herbarium volunteers has attended a Specify workshop given at the W.P. Fraser Herbarium, University of Saskatchewan, and we have conferred with the Fraser Herbarium about coordinating our efforts with theirs. If any of the *Blue Jay*'s readers would be interested in volunteering to participate in this effort, we would appreciate it. There is a small corps of volunteers who are anxious to get started on this project.

Please plan to visit the George F. Ledingham Herbarium soon. I will be delighted to orient you to the Herbarium and assist you in locating specimens if you wish. I can be contacted using the information provided above.

***EDITORS' NOTE:** For more information on George Ledingham's life, please see the In Memoriam entitled "George F. Ledingham (1911-2006)" by C. Stuart Houston and Robert W. Nero, *Blue Jay* 64(4): 225-227.

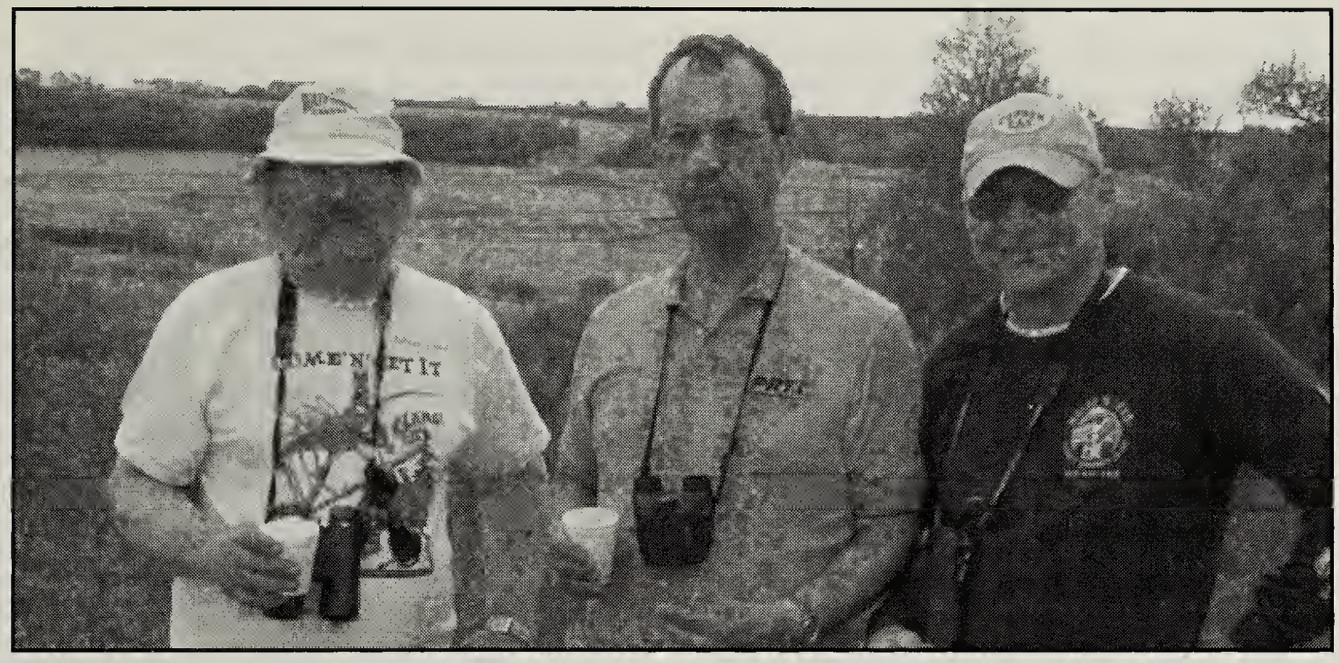
40TH ANNIVERSARY OF THE MANLEY CALLIN EKAPO LAKE BIRD OUTING

Manley Callin at the Katepwa marsh, one of his favourite bird stops near Fort Qu'Appelle, SK. Many of Nature Saskatchewan special publications were made possible through funding from Manley Callin's bequest. *Maurice Lindgren*

On 25 and 26 May 1968, David Chaskavich and I were fortunate to accompany Manley Callin and his twin brother Elmer on the first of what would be many bird outings in the Broadview area. From 1968 to the mid-1980's, Manley, David, and I were joined by a number of birders, including Johnny Nelson, Frank Brazier, and Elmer Callin, to conduct the 2-day Broadview area bird surveys. Day 1 included coverage of the Crooked/Round Lake areas north of Broadview, while Day 2 included the Ekapo Lake area south of Broadview.

Born in Whitewood, Saskatchewan, in 1911, Manley and Elmer started their birding hobby in the summer of 1925 in the Percival area, and in the spring of 1926, at the age of 14 years, they compiled their first migration list. In 1980, Manley's *Birds of the Qu'Appelle, 1857-1979* was published. Upon release of the book, an article in *The Fort Qu'Appelle Times* entitled "Bird Man Brings Fame to Qu'Appelle Valley" summarized Manley's accomplishments and birds contained in the book. Many of the species accounts documented in this book were recorded during the annual 2-day outings in the Broadview area.

David and I were fortunate to have a birding mentor as talented as Manley, who patiently assisted us with identifying birds by sight and sound.



Left to right: David Chaskavich, Carman Dodge, and Don Weidl at the Pipestone Creek valley south of Broadview, one of Manley Callin's favourite bird stops.

David Hatch, a well-known birder from Manitoba, wrote the following in the 13 July 1974 *Winnipeg Free Press Chickadee Notes*: "In Manitoba and Saskatchewan, there are many good – and some great – ornithologists, whose ability to identify birds by song alone is amazing but none is superior in this field to E. Manley Callin." Manley contributed countless articles to the *Blue Jay* and was president of the Saskatchewan Natural History Society from 1958 to 1959. Over a period of 74 years, he added several species to the Saskatchewan bird checklist. Manley was also recognized outside the "birding community," as was evident when The 60th Annual Meeting of the Saskatchewan Anti-Tuberculosis League honored their Chief Accountant, Manley Callin, at a dinner at the Bessborough Hotel on 31 May 1974.

A few of the highlights from the annual outings include my first Indigo Bunting at "Spring Fountain Picnic Site" on Highway 9 and the Qu'Appelle valley on 25 May 1968, and a male Scarlet Tanager at the same location on 6 June 1982. David and Manley observed a male Northern Parula Warbler south of Broadview during the Ekapo outing on 26 May 1979, and David saw a Cinnamon Teal at the west end of Ekapo Lake on 24 May 1986. Over a 25+-year period, the bird list for the Broadview area grew to over 250 species, many which were observed during the outings with Manley.

When Manley was laid to rest on 9 November 1985 at the Lakeview Cemetery at Fort Qu'Appelle, the annual bird outings ended*. On 18 May 2008, David, Carman Dodge, and I traveled the Ekapo Lake route that Manley had surveyed for so many years. Although much of the habitat had changed over the years, with several of the aspen groves now supporting stubble fields, many of Manley's favorite stops along this route were still recognizable. A total of 119 bird species were observed during the day, a few which had never been included in the lists when Manley was alive. The new birds for the Ekapo list included Greater White-fronted Goose, Wood Duck (nesting in a nest box that David and I had set up 10 years earlier), one adult Bald Eagle, a male Harris's Sparrow, and several House Finches, which only appeared in the Broadview area in the late 1980s. On the other hand, several species such

as Ring-necked Pheasant, Great Crested Flycatcher, and Baltimore Oriole, appear to be less common compared to the early surveys conducted with Manley.

It was not until the end of the day on 18 May 2008 that I realized that it had been 40 years since the first outing with Manley and Elmer – a good reason to celebrate and write this article. Although David and I no longer reside in the Broadview area, we have continued to keep yearly bird lists on return visits, and the lessons learned from Manley at an early age have paid off many fold.

Acknowledgement

I thank Al Smith for reviewing an earlier version of this article.

- *Don Weidl*, 1711 Broadway Ave., Saskatoon, SK, S7H 2B4

***EDITORS' NOTE:** For more information on the life of Manley Callin, please see the In Memoriam entitled "In Memoriam – Eric Manley Callin (1911-1985)" by Frank Brazier, *Blue Jay* 44(2): 66-69. Note that the photo of Manley Callin in the article by Don Weidl was first published in that Memoriam.

WHERE THE DEER AND ANTELOPE PLAY

Pronghorn observed in a field near Simpson, SK, at the north end of Last Mountain Lake. Despite often being called "Pronghorn Antelope," these ungulates are not antelopes at all. Rather, they are the only extant species in the family Antilocapridae. *Vicky Kjoss*

Rural residents of the Rosthern-Laird area can now sing the old western folk tune "Home on the Range" from personal experience.

White-tailed Deer have always been present, particularly along the two Saskatchewan Rivers nearby, but their numbers appear to have markedly increased over the last years. On one drive over municipal roads close to the South Branch at dusk, I have counted up to 150 deer feeding at the edges of poplar bushes. Mule deer can also sometimes be observed; on one occasion, 1 saw 14 walking in single file.

Four or 5 years ago, Pronghorn ("antelope") came into the district. They once roamed over the entire southern third of what is now Saskatchewan (fur trader Alexander Henry, the Younger, saw their hoofprints as far north as The Forks of the Saskatchewan Rivers in 1808[2]), but according to Banfield, they are now restricted to "the adjacent, southern corners of Alberta and Saskatchewan."[1]

On 2 November 2008, I observed a herd of 16 Pronghorn. The animals seemed to be as curious about me as I was about them, and made no attempt to flee. This sighting was 6 mi west of Rosthern, along provincial Highway Number 312, and 1 mi north. Pronghorn are often seen in twos or in small groups. This past summer, four of them regularly bedded down for the night at the edge of a farmyard 3 mi northeast of Laird. The area was freshly mowed, giving the animals a far range of vision, which is requisite for their safety.

Farmers appear pleased to have these amicable creatures around, commenting only on each antelope's beautiful markings. As the diet of Pronghorn consists mostly of weedy plants and woody browse, cereal crops are not at risk.

Since there is also a bison farm on the outskirts of Rosthern, we truly live "where the buffalo roam, and the deer and the antelope play."

1. BANFIELD, A.W.F. 1974. The Mammals of Canada. National Museum of Canada, Ottawa.

2. COUES, E., ed. 1965. The Manuscript Journals of Alexander Henry, Fur Trader of the Northwest Company, and of David Thompson, Official Geographer and Explorer of the Same Company, 1799-1814, 3 vols. Ross and Haines, Minneapolis, MN.

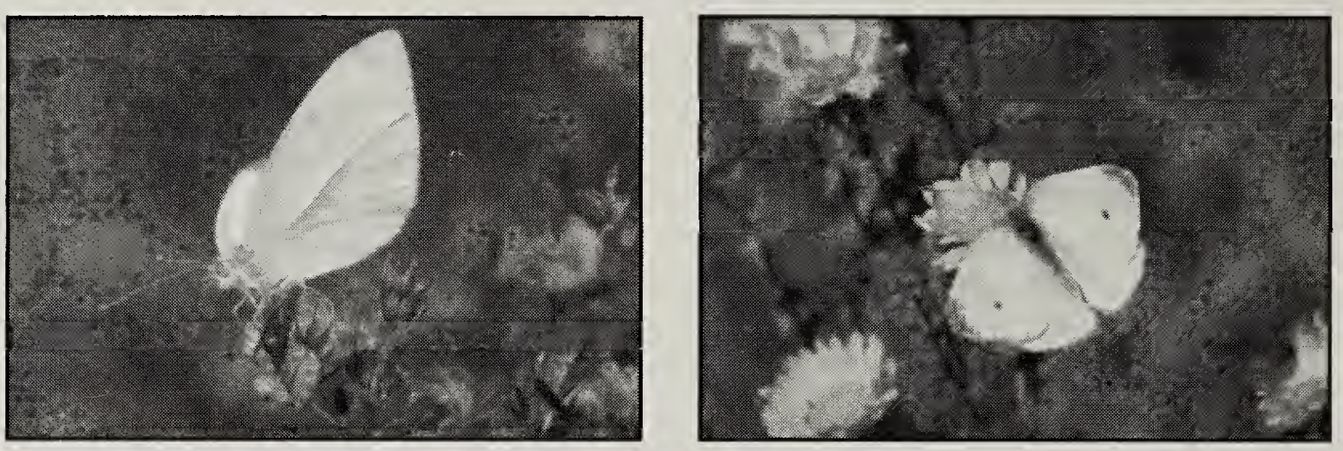
- *Victor C. Friesen*, P.O. Box 65, Rosthern, SK, S0K 3R0

ERRATUM

Jensen et al., "OCCURRENCE OF THE ENDANGERED GOLD-EDGED GEM (*SCHINIA AVEMENSIS*) AT CFB SUFFIELD NATIONAL WILDLIFE AREA, ALBERTA," *Blue Jay* 67(1) (March 2009): 50-53

The editors regrettably omitted the scientific names of several plant species mentioned in this article. Following is a list of these species: Prairie Sunflower (*Helianthus petiolaris*), Skeleton Weed (*Lygodesmia juncea*), Crested Wheatgrass (*Agropyron cristatum*), and Baby's-breath (*Gypsophila paniculata*). We apologize for any confusion this may have caused.

OBSERVATIONS OF BUTTERFLY BEHAVIOUR AND THOUGHTS ABOUT THERMOREGULATION



Wings folded during feeding (left); wings spread out (right). *Vicky Kjoss*

All insects obtain their body heat from the environment, and butterflies are no exception. On 3 May 2009, I saw my first Western White butterfly of the year, despite the fact that it seemed too cold for butterflies to fly. The Western White obligingly settled on the gravel by my truck, making identification easy. It was facing sideways to the sun with one set of wings parallel to the ground and the other at a ninety degree angle to its body. I had previously taken note of this behaviour in Western Whites in 2005, which I describe in more detail below. I was interested in when and how the various butterfly species that frequented a patch of vacant land on the southeast border of Weyburn came out of their overnight torpor, which is a state of inactivity caused by reduced body temperature.

My inspiration to observe the various poses that butterflies display just after the sun comes up was a book by Bernd Heinrich entitled *The Thermal Warriors*, in which he outlines the strategies that insects use to reach and maintain the temperatures that they need to survive day by day.[1] My journey into insect thermal regulation began as I walked on a trail etched out by all-terrain vehicles through city-owned land waiting for redevelopment. I came upon one Painted Lady after another on the ground with their backs to the sun and wings spread. As I walked towards the Painted Ladies basking on the ground, they all rose up and flew away. This was not the case with the Western White that clung to a gumweed (*Grindelia* sp.) stalk bordering the path, nor did my passage stir a Clouded Sulphur on the stalk of a plant.

It was 0830h on 20 August 2005, and the Western White and Clouded Sulphur were still in their overnight torpor, as was a Cabbage White clinging to the underside of a Prairie Sunflower (*Helianthus petiolaris*) leaf. I decided that I would return the next morning to see if I could record the coming to the dirt and gravel of the Painted Ladies to warm up prior to another day of nectar feeding. I assumed that the butterflies would not overnight in the open where they would be easy prey for nocturnal predators. Every day they must either get from where it is cooler to where it is warmer or wait for the day to heat up their hiding places.

At 0730h the next morning (21 August 2005) the air temperature was a cool 13°C and the ground temperature on the path was just one

degree higher. Despite the cool temperatures, I flushed 17 Painted Ladies off the path. While not fully active, the Painted Ladies were no longer in a state of torpor. I therefore needed to arrive much earlier to find the butterflies before they warmed enough to fly. To get a sense of how many and what kinds of butterflies I could expect to see in this patch of land at the beginning of daylight, I carried out of a number of censuses staggered over the day resulting in an estimate that for every ten butterflies seen, three would be Cabbage Whites, two Clouded Sulphurs, two Painted Ladies, one an Orange Sulphur, and the remainder could be either a Western White, Purple Copper, Variegated Fritillary, Milbert's Tortoiseshell, or a Common Checkered Skipper.

On 22 August 2005, I arrived on site at 0535h to survey a small section (20 m) of the path for butterfly activity. The air and ground temperature were the same: 13°C. I did not observe any butterfly activity in this section of the path. Nearly 1 hour later, I saw a Western White with closed wings broadside to the sun on top of a gumweed flower. Five minutes later, at 0645h, I saw another Western White clinging half-way up on a plant stalk. Neither one left its position as I placed a thermometer close to them. It was 14°C, and the sun has risen to 15 degrees above the horizon.

Five minutes later, I saw my first Painted Lady. It was closed-winged on gumweed, and the temperature had risen to 15°C. The Painted Lady stayed in the same place until 6 minutes later, when my shadow fell across it, causing it to move away. At 0700h with the sun at 20 degrees above the horizon in a moderate wind out of the southeast, two Painted Ladies flew southwest over a patch of Foxtail Barley (*Hordeum jubatum*). Shortly thereafter, two more Painted Ladies flew over the foxtail, and the temperature had now risen to 16°C. The flight pattern of all the Painted Ladies seemed to be composed of slower, deeper wing beats than normal.

At 0710h, I noted a Purplish Copper, perched on top of a gumweed flower with its wings spread facing the sun. It flew away as I approached to within 1 m of it. To the north and west of me were more Painted Ladies flying, and I observed others on the pathway. It was now 0727h, and the air temperature was still 16°C and the ground temperature on the pathway was 17°C. The first two butterflies that I noted an hour earlier up on plant stalks - Western Whites - still did not stir at my approach.

By 0800h, the air temperature had risen to 18°C, and the ground temperature was 20°C. A Cabbage White with its wings spread in a V facing the sun flew away at my approach, as did two others who flew up and then back down into foliage away from me. As well, a Common Checkered Skipper, with outspread wings on a flower top facing the sun, flew away at my approach. Five Painted Ladies rested on a 30-cm square of dirt sloping towards the sun. It appeared that by this time, all of the butterflies were fully active following the night-time period of dormancy.

On 23 August 2005, the weather was unsettled, with gusts of wind and clouds covering and uncovering the rising sun. At 0600h, the air temperature was 15°C, and the ground was 14°C. I saw the first Painted Lady with closed wings on a clover top. It did not move at my approach, nor did the next Painted Lady, which was clinging to the head of a brome grass (*Bromus* sp.) shoot.

Milbert's tortoiseshell.

It was now 0630h and the air temperature was 17°C. The weather became progressively more unsettled as rain clouds moved in. By 0730h, I was forced to leave as a smattering of rain droplets fell. For the next few days, clouds, gusts of wind, and rain showers keep me and the butterflies under cover.

I returned to the site on the evening of 28 August 2005. Six species of butterflies were still flying about, with one glaring exception – there were no Painted Ladies. I don't know why they were not observed. Perhaps they had left Weyburn on one of their enigmatic migrations southward. I meandered about the next few days as summer changed into fall. The days were still warm but nights were becoming colder, and the grasses were losing their heads. Florets of the gumweed and the Prairie Sunflowers had dried up. All that would remain flowering by the second week of September was Yellow Sweet Clover (*Melilotus officinalis*). While the numbers and species of butterflies decreased as the flowers disappeared, I continued to marvel at butterfly strategies to gather up sunlight to give themselves the strength to fly about.

On 3 September 2005 at 0900h with the air temperature at 20°C and the ground at 22°C, a Western White was on the dirt at right angles to the sun. One wing was flat against the ground, the other was upright at 90 degrees to the ground. It flew up at my approach and settled down a bit farther away, taking up its hinge-like position oriented to the sun once again. Nearby, another Western White was closed-winged, parallel to the sun, clinging to a plant stalk. Later in the morning, the air temperature rose to 22°C and the ground temperature was 24°C. A Variegated Fritillary was flat on the ground with its wings spread out, head first and oriented to the sun. This was different from the behaviour of Painted Ladies, which would turn so that their bodies would be on an incline to catch even more sunlight. Clouded Sulphurs started lining up at right angles to the sun with folded wings on the gravel of the pathway. These basking spots, previously occupied by Painted Ladies, were generally two degrees warmer than the surrounding air.

By 21 September 2005, I wanted to end my observations for the season by examining Clouded Sulphurs on plant stalks before they went to the warmer ground - a difficult search since it was now not much above freezing at sunrise. As well, the sun seemed to rise quicker and daytime temperature highs were reached more rapidly. My window of opportunity to see changing butterfly behaviour would therefore be shorter. At 0920h with the air temperature at 15°C and the ground temperature at 14°C, I observed a Clouded Sulphur clinging to a stalk with its wings closed, parallel to the sun. Soon another Clouded Sulphur fluttered up from the mat of underlying plants and tried to grasp a nearby plant stalk. It missed and fell back down to the mat where it righted itself and folded its wings. Neither of these two butterflies moved as I came right up to them.

I am not certain that butterflies spend the entire night on plant stalks as they were often observed in the mornings

of my studies. However, I believe that they go from these perches to more open spots to warm themselves up when the sun rises. The butterfly species I observed appeared to use different behavioural approaches to warming. Clouded Sulphurs never spread their wings to warm up, whereas Bronze Coppers, Painted Ladies, and Variegated Fritillaries all spread their wings during warming. The reason for this is unclear, but likely has to do with the location of darker, heat-absorbing colouration on the bodies of each species. Western Whites, while starting their day with closed wings (displaying the darker dorsal side), open their wings and display their lighter face as the day continues to warm up.

Generally speaking, the species of butterflies that I observed gravitated to the ground from plant perches to bask as ground temperatures rose above the surrounding air temperature. Painted Ladies, because they were the first to follow this pattern every morning, were the first to be able to fly about each day. The cues that Painted Ladies and other species use to select overnight perches and basking sites remain undetermined. Further research is required in this area.

1. HEINRICH, B. 1996. The Thermal Warriors. Harvard University Press, Cambridge, MA, USA.

Martin Bailey, 107-1825 Coteau Avenue, Weyburn, SK; E-mail: <cmbb@sasktel.net>

*These two Greater Short-horned Lizards (*Phrynosoma hernandesi*) were photographed on 16 May 2009, just after mating in Grasslands National Park in southwest Saskatchewan. These reptiles exhibit strong sexual dimorphism, with the males being much smaller than the females (as seen here). Mating occurs in early spring, and females give birth to live young in late July or early August. The Greater Short-horned Lizard is listed as an endangered species by COSEWIC.* Jessica Martino, *Department of Biology, University of Regina, Regina, SK; E-mail: <martinoj@uregina.ca>*

AMERICAN DIPPER AND SLATY-BACKED GULL IN SASKATOON

Figure 1. Presumed Slaty-backed Gull (larger bird on right) observed in Saskatoon, SK. This species commonly breeds along the coasts of northeastern Asia. Although it frequently travels to western Alaska, it is seldom observed elsewhere in North America. *Nick Saunders*

On 19 April 2009, a friend and I discovered an American Dipper (see inside front cover) along the west shore of the South Saskatchewan River in Saskatoon, SK. The bird was observed hopping along the rocks and was seen on numerous occasions by other observers for a couple of weeks afterwards. Spending a lot of time near the pump house of the water plant, the dipper seemed to enjoy the fast-running water that spewed out of the pipes and into the river. Fairly common in the Alberta Rockies and sometimes showing up in the Cypress Hills, this is Saskatoon's second ever American Dipper record.

Other Saskatchewan records for this species include Buffalo Pound Lake and Skull Creek.

On the same day, we also found what is now believed to have been a Slaty-backed Gull (Fig. 1) on the gull roost observed at the same location on the west bank of the river close to the Queen Elizabeth Power Plant. Saskatchewan's third record of a Slaty-backed Gull, this was quite an exciting find, and other local birders were also able to add this to their life-lists.

Nick Saunders, 4th Street East, Saskatoon, SK, S7H 1J9; E-mail: <nikovich@sasktel.net>

LETTER TO THE EDITORS

Dear Editors,

The current rate of extinction of mammals worldwide is a matter of grave concern. A large number of factors are contributing to the unfortunate trend of vanishing wildlife. Some of the most important factors identified include habitat loss and fragmentation, harvesting, infectious diseases, climate change, and environmental pollution. The recent publication of a seminal study by Schipper *et al.* (2008) in the internationally reputed journal *Science* found that 25% of global mammalian species are now threatened with extinction.[1] The authors indicated that human activities contribute the most to factors that increase risk of extinction. In particular, pollution of the environment and high rates of habitat loss caused by humans have been attributed as the two major factors that have impacted global mammal populations.[1] This research report carries a significant message for all of us inhabiting different parts of the globe by highlighting the astonishing rate at which we are losing wildlife species.

If we examine our immediate surroundings in the Prairie and Northern Region of central Canada, it is disheartening to learn that a total of 37 species (24 animals, 13 plants) are at high risk of extinction in this region.[2] The animal species include four insects, one mollusc (snail), one reptile, two fishes, twelve birds, and four mammals (Appendix 1). The plant species include one lichen, one moss, and eleven angiosperms. Of the angiosperms, five are dicots and six are monocots (Appendix 1). Forty-six percent of the listed animal species are considered endangered, and 54% are threatened. For plants, 31% are endangered, while 69% are considered threatened.

It is important that we all act together in preventing the loss of wildlife species. One of the most important steps is to be aware of the situation and to do our best to promote conservation. Sustainable and environment-friendly farming practices are important for reducing pollution and should be encouraged at the provincial level. Protection and conservation of wild habitats must take precedence over short-term economic gains. Human activities at vulnerable sites (such as national parks) need to be monitored more closely to detect any abrupt threats or changes to ecosystems as early as possible. It is important that we train younger generations to respect and appreciate nature from an early age. Such practices are critical first steps towards helping species at high risk thrive in their natural surroundings.

1. SCHIPPER, J. *and 129 others* (2008) The status of the world's land and marine mammals: Diversity, threat, and knowledge. *Science* 322: 225-230.

2. ENVIRONMENT CANADA (2009) Species at risk in the Prairie and Northern region. Available online at http://www.mb.ec.gc.ca/nature/endspecies/sar/index.en.html (Accessed 14 April 2009).

Appendix I. Animal and plant life at risk in Environment Canada's Prairie and Northern region that are listed under the Species at Risk Act (Schedule 1). T= Threatened, E = Endangered.

I. ANIMALS

A. INVERTEBRATES

[A1] Insects

1. Mormon Metalmark (Prairie population) (*Apodemia mormo)* [T]
2. Yucca Moth (*Tegeticula yuccasella*) [E]
3. Dakota Skipper (*Hesperia dacotae*) [T]
4. Poweshiek Skipperling (*Oarisma poweshiek*) [T]

[A2] Molluscs

1. Banff Springs Snail (*Physella johnsoni)*[E]

[B] VERTEBRATES

[B1Fishes

1. Carmine Shiner (*Notropis percobromus)* [T]

2. Western Silvery Minnow (*Hybognathus argyritis)* [T]

[B2] Reptiles
1. Prairie Skink (*Eumeces septentrionalis*) [E]
[B3] Birds
1. Burrowing owl (*Athene cunicularia*) [E]
2. Eskimo Curlew (*Numenius borealis*) [E]
3. Greater Sage-grouse (*Centrocercus urophasianus urophasianus*) [E]
4. Least Bittern (*Ixobrychus exilis*) [T]
5. Loggerhead Shrike - Eastern population (*Lanius ludovicianus migrans/ excubitorides*) [T]
6 Mountain Plover (*Charadrius montanus*) [E]
7. Peregrine Falcon (*Falco peregrinus anatum*) [T]
8. Piping Plover (*Charadrius melodus circumcinctus*) [E]
9. Ross's Gull (*Rhodostethia rosea*) [T]
10. Sage Thrasher (*Oreoscoptes montanus*) [E]
11. Sprague's Pipit (*Anthus spragueii*) [T]
12. Whooping crane (*Grus americana*) [E]

[B4] Mammals
1. Swift Fox (*Vulpes velox*) [E]
2. Wood Bison (*Bison bison athabascae)* [T]
3. Woodland Caribou - Boreal population (*Rangifer tarandus caribou)* [T]
4. Grey Fox (*Urocyon cinereoargenteus)* [T]

II. PLANTS
[A1] Lichens (symbiotic association of algae and fungi)
1. Flooded Jellyskin (*Leptogium rivulare*) [T]
[A2] Lower plants (Mosses)
1. Haller's Apple Moss (*Bartramia halleriana*) [T]
[A3] Higher plants (Angiosperms/closed-seeded plants)
[A3-1] Monocotyledonous plants (bearing single cotyledon in their seed)
1. Buffalo grass (*Buchloë dactyloides)* [T]
2. Soapweed (*Yucca glauca*) [T]
3. Western Blue-flag (*Iris missouriensis*) [T]
4. Western Prairie Fringed-orchid (*Platanthera praeclara*) [E]
5. Western Spiderwort (*Tradescantia occidentalis*) [T]

[A3-2] Dicotyledonous plants (with two cotyledons in their seeds)
1. Hairy Prairie-clover (*Dalea villosa* var. *villosa*) [T]
2. Small-flowered Sand-verbena (*Tripterocalyx micranthus*) [E]
3. Western Silvery Aster (*Symphyotrichum sericeum*) [T]
4. Tiny Cryptanthe (*Cryptantha minima*) [E]
5. Small White Lady's-slipper (*Cypripedium candidum)* [E]
6. Slender Mouse-ear-cress (*Halimolobos virgata*) [T]

Saikat Kumar Basu, Department of Biological Sciences, University of Lethbridge, Lethbridge, AB, T1K 3M4; Email: <saikat.basu@uleth.ca>

Cape May Warbler female drinking sugar water from a glass in a backyard north of Pike Lake, SK. *Nick Saunders*

RIVALRY IN AMERICAN WHITE PELICAN CHICKS: SIBLICIDE IN ACTION

Figure 1. American White Pelican chicks during an aggressive interaction, likely leading to eventual siblicide. The chick on the left is 2-3 days older and can use its size advantage to dominate its sibling. *Vicky Kjoss and Chris Somers*

Spring is the time of year when many bird species are nesting and raising young. Many of us have developed a romanticized view of this process, perhaps because the family unit consisting of the male and female struggling to raise a brood of helpless chicks reminds us of ourselves. However, we should all take a moment to reflect on Lord Tennyson's famous words from the poem *In Memoriam A.H.H.*: "Nature, red in tooth and claw", and realize that things are not always as they seem. The world of relationships among birds and their young has a seedy underbelly.

Figure 1 shows two American White Pelican chicks photographed in their nest during research in the breeding colony on Reed Lake, Saskatchewan (50°23'48.22"N, 107°04'48.28"W), in the spring of 2005. The larger chick is approximately 1 week to 10 days old, and the smaller one is 2-3 days younger. This photograph captures an aggressive interaction between the two chicks that happens frequently, but is rarely observed. Ultimately the larger chick, through aggressive domination and injury to the younger one, will monopolize the food delivered by its parents, resulting in the death of its younger sibling - a phenomenon called siblicide. Surprisingly, this behaviour is seen in many bird species (although there are patterns in the types of species) and determining why it happens has been the fuel for a wide range of behavioural and evolutionary research.[1]

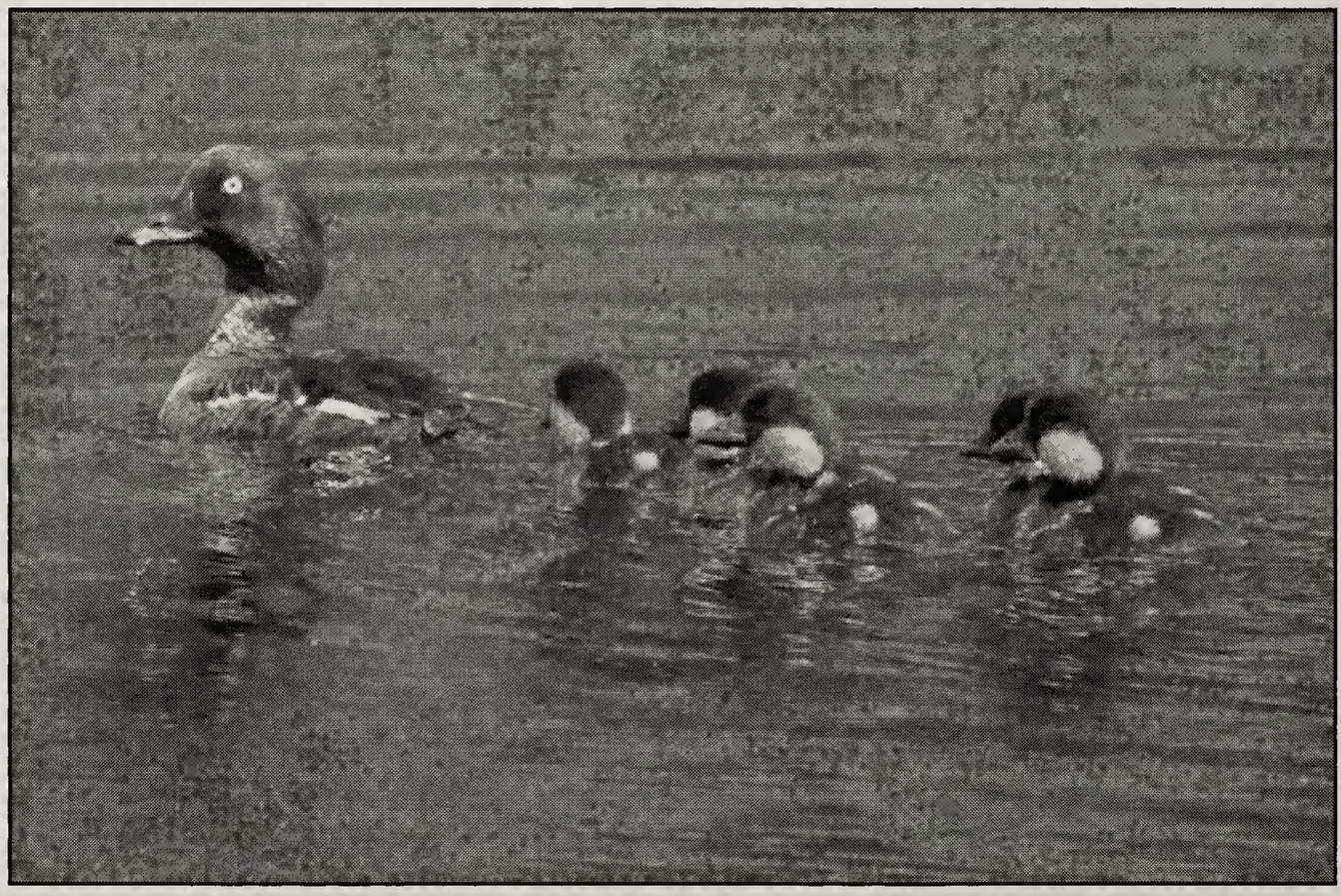
American White Pelicans generally lay two eggs, but rarely raise more than one chick to fledging because of siblicide. In fact, more than 90% of

nests that have been surveyed in North America started with two hatched chicks, but experienced brood reduction resulting in the fledging of only one chick. The younger chick usually dies of starvation with the first 2 weeks of incubation. Siblicide is aided in pelicans by asynchronous hatching caused by an average of 2 days between laying the first and second egg. The size advantage this confers to the first chick, which has a 2-day head start, allows it to dominate the second one. At first glance this seems like a tragic waste of young pelicans and parental investment. However, it has been proposed that the second egg serves as an "insurance policy": if the first egg is not viable or the chick dies early on, a second one is readily available. This is perhaps especially critical for pelicans, which may have difficulty raising two chicks, and do not usually re-lay when eggs are lost or fail.[2]

1. MOCK, D.W. 2004. More than Kin and Less than Kind: the Evolution of Family Conflict. Harvard University Press, Boston, MA, USA.

2. KNOPF, F.L., and R. M. EVANS. 2004. American White Pelican (*Pelecanus erythrorhynchos*), The Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, NY, USA. Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/057

Christopher Somers, E-mail: <chris.somers@uregina.ca>; *and Victoria Kjoss*, Department of Biology, University of Regina, 3737 Wascana Parkway, Regina, SK, S4S 0A2.



Common Goldeneye female and chicks at Waskesiu River. *Nick Saunders*

NATURE LIBRARY

BIRDS OF THE ROSETOWN-BIGGAR DISTRICT

ROBERT D. WAPPLE and WAYNE E. RENAUD. 2008. Manley Callin Series No. 7 and Nature Saskatchewan Special Publications No. 27. Nature Saskatchewan, Regina, SK. 384 pages. Soft Cover. 21.5 cm by 14 cm. 1 map, 4 figures, 31 black and white photographs. $24.95 CDN. ISBN: 978-0-921104-23-0.

This book is the last of the regional bird books published by Nature Saskatchewan before the massive two-volume *Birds of Saskatchewan* book set is completed. It is also an update of the original edition of the *Birds of Rosetown-Biggar District* published in 1975.[3] This edition has more than three times the number of pages than the first edition. Like the previous regional bird books, it is not a bird identification guide. Its purpose is to provide local information about birds and their habitats, bird occurrence and abundance, spring and fall arrival and departure dates, and any breeding and wintering records.

The authors successfully replicated the high standards set by the *Birds of the Elbow* and the subsequent regional bird books.[4] It is more plain than the 8 × 11 *Birds of the Saskatoon Area*, with only a limited number of excellent black and white photographs by George Tosh, a few figures, and no bird drawings.[2]

The book begins with a dedication to William Jasper and Wayne Harris, who did extensive ornithological work in the study area. The first section of the book gives a very useful overview of the study area and how it differs from the original study area. A list of places and geographical features discussed in the book along with their map coordinates is given here. The map of the study area is found on the inside back cover. Unfortunately, the greyscale map is difficult to read. A more readable colour insert of the study area map is now included with the book.

A very useful and interesting summary of the archaeology and cultural history of the study area is included in the book. The discussion of the study area's climate, geography, hydrology, and the main bird habitats is detailed but succinct and well written. Although I have visited parts of the study area, reading the study area background was very helpful. This section is sprinkled with a number of small black and white photographs.

Following the section of the study area background is a list of abbreviations used in the species accounts. The list of abbreviations is followed by the introduction to the species accounts. This section uses the same terms and definitions used in the *Birds of Elbow* and the subsequent regional bird books.[1, 2, 4] These terms cover bird breeding and migration status, abundance, seasonal occurrence, median spring arrival and departure dates, and status designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Reviewing these definitions before using the species

accounts for the first time is highly recommended. This section also has a brief summary on Breeding Bird Surveys, Christmas Bird Counts, Owl Surveys, and banding conducted in the study area. Species-specific banding information is included when available in the individual species accounts.

Over 80% of the book is dedicated to the 282 species accounts. These species accounts vary in size and format based on the amount of information available and the status of the species. There are introductory sections to waterfowl, shorebirds, and warblers. These sections were useful overviews of the species groupings. Other bird groupings such as raptors and sparrows should have had introductory sections as well.

The species accounts are clearly written and the information is error-free. These accounts briefly discuss any interesting behaviour observed by local bird watchers, first records of the species in the study area, and locations and habitats used by the species. Any breeding, wintering, and banding records, occurrence records, and extreme and median arrival and departure dates are also included. These accounts are similar in style to those found in *Birds of the Elbow* and *Birds of the Saskatoon Area*.[2,4] I prefer full sentences over the heavy reliance on abbreviations and short sentences used in species accounts as found in the *Birds of Yorkton-Duck Mountain*.[1] A few photos are included throughout the species accounts, but more photos or bird drawings would have made this book more attractive.

Two appendices and an extensive and useful bibliography of over 150 references are provided. The first appendix is a list of non-avian species mentioned in the book, and the second appendix is a list of bird kills at SaskTel communication towers near Stranraer in August 1989. An Index or a detailed Table of Contents would have been useful in finding information more quickly and more easily.

This book clearly exceeds its goal in providing a useful and concise updated written record of the birds of the Rosetown-Biggar District. I highly recommend this book anyone interested in the Rosetown-Biggar District and its birds.

1. HOUSTON, C.S. and W. ANAKA. 2003. Birds of Yorkton and Duck Mountain. Manley Callin Series No. 6 and Nature Saskatchewan Special Publication No. 24. Nature Saskatchewan, Regina, SK.

2. LEIGHTON, A., J. HAY, C.S. HOUSTON and S. SHADICK. 2002. Birds of the Saskatoon Area. Manley Callin Series No. 5 and Nature Saskatchewan Special Publication No. 23. Nature Saskatchewan, Regina, SK.

3. RENAUD, W.E. and D.H. RENAUD. 1975. Birds of the Rosetown-Biggar District. Nature Saskatchewan Special Publication No. 9. Nature Saskatchewan, Regina, SK.

4. ROY, J.F. 1996. Birds of the Elbow. Manley Callin Series No. 3 and Nature Saskatchewan Special Publication No. 21. Nature Saskatchewan, Regina, SK.

Reviewed by Rob Warnock, E-mail: <warnockr@accesscomm.ca>

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GRASS, SKY, SONG: PROMISE AND PERIL IN THE WORLD OF GRASSLAND BIRDS

TREVOR HERRIOT. 2009. Harper Collins Publishers Ltd., Toronto. ON. Hardcover. 288 pages. 14.6 x 21.2 x 1.5 cm. 17 black and white drawings. ISBN - 10: 1554680387. $32.95 CDN

Western Meadowlark singing in Grasslands National Park, SK.
Vicky Kjoss & Chris Somers

Grass, Sky, Song is a book that eloquently reveals the spirit of the grassland world, and the uniqueness of its birds. The author, Trevor Herriot, draws on over 20 years of experience as an observer of nature to draw the reader to both the beauty of grassland landscapes and wildlife, and threats to their existence.

The author speaks clearly from the heart, which greatly enhances the book. He openly shares his passion, fears, and hopes for the prairie and its birds. Personal stories and observations make the book riveting. Particular highlights include his personal 'discovery' of grassland birds and the 2005 retracing (with Stuart Houston) of John Macoun's expedition across southern Saskatchewan in the late 1800s. At times, Herriot makes you laugh with a funny anecdote and other times makes you very sad with facts and observations about grassland bird decline and the alarming increased incidence of cancer in prairie people,

including his own family. I was often relating what I read to my own personal experiences and observations of the prairie landscape. His excellent, easy to read and poetic prose does truly make the prairie, birds and wildlife, the people, and the many threats to them literally come alive.

Although not a science book *per se*, Herriot clearly distills complex scientific issues with eloquent prose and strategic use of statistics, making the issues discussed readily understandable and useful for both the layperson and the expert. The bird conservation issues discussed in the book are similar to those found in Brigit Stuchbury's highly regarded book the *Silence of the Songbirds*.[1] Through 18 chapters, Herriot discusses factors affecting bird conservation, such as socio-economics, human population growth, habitat loss, climate change, and pesticides, as well as bird population monitoring and trends. His research for *Grass, Sky, Song* is impeccable, and his interviews with prominent prairie ornithologists such as Stuart Houston and Steve Davis further strengthen the book. At the end of the book, there is a useful notes and references section.

Between each chapter is a two- to three-page profile of grassland bird species at risk of extinction. These profiles briefly and accurately describe each species' status and threats to its existence and how its natural history attributes interact with the current and evolving prairie landscape. For each species profile, there is a beautiful drawing of the species by the author. Seventeen grassland species are specifically profiled in this book, including Sharp-tailed Grouse, Western Meadowlark, Burrowing Owl, Sprague's Pipit and Swainson's Hawk. These species profiles complement and strengthen the main chapters of the book.

Herriot is correct in saying that loss of grassland birds and their habitats diminishes the value of prairie and makes us poorer. A good question is 'if grassland birds disappear, is it still a truly functional prairie?' We face the real prospect of a 'silent spring' as described by Rachel Carson on the prairie in the future.[2]

Although from different perspectives (self-taught naturalist versus professional biologist), and considering different birds and habitats, Herriot and Stuchbury have come to the same conclusion that we need hope, and practical ways to help advance bird conservation and strengthen the bonds between nature and culture. Like Stuchbury, Herriot successfully ends the book with practical ways for people to help birds and their habitats. These include smart consumer choices that can sustain the prairie, education of others about the prairie and its birds, effective conservation efforts that make a positive difference, and effective lobbying efforts to ensure positive outcomes from government decision-makers.

In conclusion, I highly recommend this book to anyone interested in prairie bird conservation and ecology.

1. STUCHBURY, B. 2007. Silence of the Songbirds. Harper Perennial, Toronto, ON.

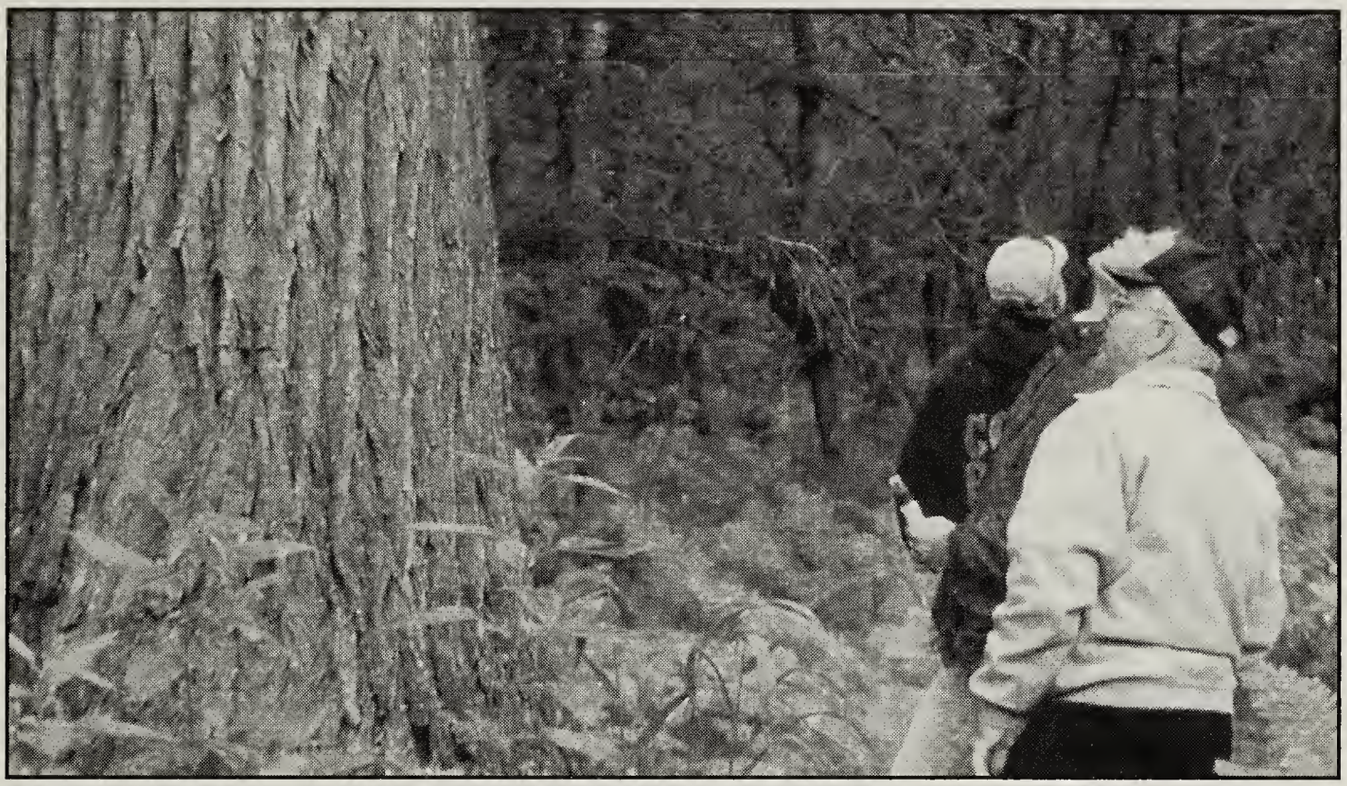
2. CARSON, R. 1962. Silent Spring. Houghton Mifflin Harcourt, Boston, MA, USA.

Reviewed by Rob Warnock, E-mail: warnockr@accesscomm.ca

IN MEMORIUM

IN MEMORIAM: ALEXANDER RENDEK (1932 - 2009)

DIETHER PESCHKEN, 2900 Rae Street, Regina, SK, S4S 1R5.



Alex Rendek guides visitors in the Sanctuary past one of the giant American Elms. June 2003. *Bernie Ryma*

Alexander Rendek was born on 16 March 1932 in Middle Lake, SK, and passed away on 31 March 2009. He had four brothers and four sisters and was married to Doreen (née Schmidt) for 55 years. He farmed in the northeast area of Saskatchewan for most of his life. Alex was a very community-minded man and was recognized for many achievements and volunteer services: he received The Melvin Jones Fellowship Award by the Lions International in 1996, the International Year of the Volunteer Award in 2001, the Canadian Wheat Board Recognition Award in 2003, and the Commemorative Medal for the Centennial of Saskatchewan in 2006. Alex served on many local committees, including the Hudson Bay Airport Committee, Hospital Board, Town Council, and the Wheat Pool Board, and was a School Board Trustee for 35 years.

To lovers of nature, Alex is known mainly as the former owner and then ardent and indefatigable steward of The Rendek Elm Forest. In 1981, Donald Hooper, Les Baker, and Dr. Vernon Harms visited the site and were enthralled with its beauty and ecological value. In 1981, Vernon, Les, Donald, and Patricia Sky conducted a preliminary survey of the flora. In 1986, the Saskatchewan Natural History Botany Tour, under Dr. Jim Jowsey, included a survey in this elm forest. In November 1989, all these activities culminated when Alex agreed to

preserve the area for future generations instead of logging the valuable timber and farming the area. The Saskatchewan Natural History Society (now Nature Saskatchewan) and the Saskatchewan Wildlife Federation became owners of the 35.3 acres (14.2 ha), with Nature Saskatchewan responsible for the administration. The sanctuary was opened officially on 21 June 1991 with nature hikes and refreshments and was named The Rendek Elm Forest Nature Sanctuary in honour of Alex.

The Rendek Elm Forest is a peninsula formed by the Red Deer River and the Smoking Tent Creek. A rich soil and frequent flooding nourishes a luxuriant flora. Mature, towering American Elm (*Ulmus americana*) covered about 75% of the area, with Balsam Poplars (*Populus balsamifera*) and Manitoba Maple (*Acer negundo*) concentrated on the east side. An amazing understory of at least 78 plant species includes Ostrich Fern (*Matteuccia struthiopteris*), which reaches over 2 m, and five plant species considered rare in Saskatchewan. Lichens, birds, and other wildlife are also abundant.

Alex became an enthusiastic and tireless steward of the "park," as he liked to call it, along with fellow steward Moe Alain. With the financial support of the Town of Hudson Bay, the Rural Municipality of Hudson Bay, and SaskEnergy, Alex put in countless hours creating signage, nature trails, a small parking lot, and a picnic site complete with a rustic table and an outhouse. A brochure, developed in cooperation with the Town of Hudson Bay, extolled the beauty and wildlife of the site. Visitors came by the bus load. Often, Alex acted as tour guide. In 2004, he received the Volunteer of the Year Award from Nature Saskatchewan.

Alex put in an enormous amount of work in keeping the trails open and safe, repairing or replacing signs and the picnic table when hooligans or flood waters and blocks of ice had destroyed them. Work increased when Dutch elm disease was discovered in 1999. The disease spread rapidly. Alex appeared on the front page of *Saskatchewan Naturally* (Vol. 3, No. 3) under the title "Beetle Sleuth. The fight against Dutch elm disease in Saskatchewan." He tried hard to stem the raging epidemic and to keep the trails safe by having dead trees cut down and the logs moved away from the trails. However, floods, normally welcomed to nourish the luxurious flora, washed many logs back onto the trails. Alex persisted in his efforts, and in 2003, a class of students visited the Sanctuary to learn about natural succession. Even in 2004, *The Hudson Bay Post-Review* still extolled the beauty of the forest despite the many dead elms. Some trees, such as poplars and Manitoba Maple, and tall bushes had begun to fill in the gaps left by dying and dead American Elms. The Sanctuary is currently closed to visitors for safety reasons. The town of Hudson Bay is hoping to reopen it, but this may take several years.

It must have been heartbreaking for Alex to see his beloved elms succumb to the ravages of the disease. Being a frugal farmer, he contemplated salvaging some of the elms for lumber but abandoned the idea when he realized that the logging would harm the understory and hamper succession. Instead he resolved to let nature repair itself.

The Rendek Elm Forest Sanctuary will return to health, albeit with different species, and it will be preserved thanks to the generosity and perseverance of Alexander Rendek.

MYSTERY PHOTO

JUNE 2009 MYSTERY PHOTO

See bottom inside back cover. We photographed this hungry little fellow in a nest that was constructed inside an outhouse in the parking lot of the Nicolle Flats Nature Area at Buffalo Pound Provincial Park near Moose Jaw, SK. Can anyone help us identify the species ?

ANSWER TO MARCH 2009 MYSTERY PHOTO

Our March Mystery Photo elicited several reader responses.

Mae Elsinger, Rangeland Biologist for Agriculture and Agri-Food Canada (Brandon, MB), writes, "I'm going to suggest that it is a gall caused by some kind of insect parasite, created for a safe site to lay eggs and provide food for hatchlings. I don't know which parasite, but I think many can cause this to happen. Judging from the spines, I would suggest that it is on a rose bush, though I can't be certain which one, but the shape of the spines would lead me to guess *Rosa woodsii*. I think I have seen these before. They develop a purplish shade to them."

Ernie Kuyt writes, "My guess about the March 2009 Mystery Photo in The Blue Jay (and, not being a hymenopterist, a guess it must be), is that the mace-like objects are the results of activities by a Gall Wasp, family Cynipidae, on the unsuspecting leaves of a Prickly Rose."

Finally, **Anna Leighton** contributed the following: "My gall book suggests that this gall on some species of rose (probably not identified for the photo) is caused by the Spiny Leaf Gall Wasp, *Diplolepis polita*. Images of galls caused by this insect match this image well. I don't know if there is more than one gall-former that makes this shape of gall or whether we can assume it is this species. What I don't know is whether this gall was made on the leaf or on some other part of the plant, which information affects the species of gall-former."

We thank **Michelle Lanoie** of Prince Albert, SK, for contributing the photo.

Blue Jay, founded in 1942 by Isabel M. Priestly, is a journal of natural history and conservation for Saskatchewan and adjacent regions. It is published quarterly by **Nature Saskatchewan, 206-1860 Lorne Street, Regina, Saskatchewan S4P 2L7.**

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Common names are used for birds, mammals, butterflies, reptiles and amphibians. Bird names follow the Checklist of North American Birds by the American Ornithologists' Union (7th edition, 1998); mammal names, Mammal Species of the World by Wilson and Reeder; butterfly names, The Butterflies of Canada by Layberry *et al*; and names of reptiles and amphibians follow Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico by Brian I. Crother, Committee Chair (2001), <http://www.ssarherps.org/pdf/Crother.pdf>. For other groups, both scientific and common names are included.

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